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Pulmonary Arteriosclerosis.—The term pulmonary arteriosclerosis implies a disease or syndrome, the outstanding features of which are referable to arteriosclerosis of the lesser circulation, this lesion being the predominant pathological finding. The word "arteriosclerosis" implies any change leading to thickening of the vessel wall. Three cases of pulmonary arteriosclerosis are described. They have one feature in common: namely, extensive atheroma of the pulmonary artery and of its branches. Pulmonary atheroma is a concomitant of pulmonary arterial hypertension. Mitral stenosis is the commonest cause of pulmonary atheroma, and is an example of venous obstruction. Capillary obstruction is exemplified by emphysema, in which there is a marked reduction in the total capillary bed. The arterial changes found in pulmonary arteriosclerosis bear a striking resemblance to those found in chronic interstitial nephritis. Points which seem most suggestive of the diagnosis are (1) a history of chronic pulmonary disease (bronchitis); (2) the presence of extreme cyanosis out of all proportion to the degree of dyspnoea, accompanied by polycythaemia, and enlargement of the right heart without valvular disease; and (3) rapid development of oedema, which often affects the arms as well as the legs and abdomen. The diagnosis is more certain in the absence of pronounced emphysema.—*Pulmonary Arterio-Sclerosis, C. G. Paine and R. Platt, Brit. M. J., April 25, 1931, no. 3668, 698.*—(*M. E. P.*)

Sclerosis of Pulmonary Artery with Thrombosis.—The diseases of the pulmonary artery fall into four groups, as follows: (1) congenital disease, usually stenosis, but occasionally dilatation; (2) primary sclerosis, which includes several different lesions; (3) syphilitic disease; and (4) secondary sclerosis, occurring in cases in which the pulmonary blood-pressure is thought to be raised, such as fibrosis of the lungs, emphysema, and mitral stenosis. This is the commonest group but it has attracted little attention. Endarteritis obliterans of the small pulmonary-artery branches, in a case of mitral stenosis, is reported. There was no evidence of syphilis. It is suggested that a chronic pneumonic process, possibly of rheumatic origin, may be the local determining cause of the lesion. Atheroma of the main intrapulmonary branches of the pulmonary arteries is common in heart disease, especially mitral stenosis, and in emphysema. Six cases of thrombosis of large branches of the pulmonary artery in cases of emphysema or heart disease are described. The condition is evidently quite common. In all cases except one (in which there was no histological examination of the thrombus) there was microscopical evidence of organization of

the thrombus.—*Sclerosis of the Pulmonary Artery with Thrombosis, O. Brenner, Lancet, April 25, 1931, ccxx, 911.*—(*R. D.*)

Obliterative Pulmonary Arteriolosclerosis.—The only case of this condition occurring in about 12,000 necropsies at Johns Hopkins Hospital is described in detail as to clinical course and pathology. The pertinent facts in the clinical course are as follows: A negro female aged 39 years had tonsillitis frequently until 30 years of age. At 24 she became dyspnoeic on exertion and one year later had fainting attacks on excessive exertion preceded by a sensation of epigastric fulness and tightness about the heart without pain. Attacks were averted by rest. One year before death a uterine myoma was removed. The heart seemed normal then, except for a systolic murmur to the left of the sternum and accentuation of the pulmonic second sound. Five months before death, cough, dyspnoea, fulness of the abdomen, and cardiac oppression confined the patient to bed. On admission to the hospital one month before death her temperature was 100°, pulse 125, respiration 24, blood-pressure 125/95; there were dyspnoea, cyanosis and a dry cough. The patient was listless, the cervical veins were engorged and pulsating. There were fine râles at the bases of the lungs. The heart was enlarged in all directions; there were present a presystolic gallop, a bell-like first sound, low systolic murmur, and faint midsystolic murmur at the apex. The pulmonic second sound was accompanied by a palpable shock. The rhythm was regular. The liver was enlarged, but oedema of the extremities was slight. There was very slight polycythaemia. The Wassermann test was negative. Death occurred with nausea, dyspnoea, restlessness, delirium, and precordial and epigastric pain. At necropsy four hours later the anatomical diagnosis was as follows: "Arteriosclerosis of the pulmonary arteries with secondary thrombosis and organization of thrombi. Haemorrhagic infarction of right lung. Hypertrophy and dilatation of right auricle and ventricle. Extreme chronic passive congestion of viscera." Nowhere was there any evidence of syphilis. In the pulmonary artery the tissue which produced the great thickening of the intima was a very loose network, with wide spaces filled loosely with large cells whose cytoplasm was evidently loaded with fat. Disintegrated blood was found in the smaller branches, some of which were occluded by new tissue in the intima. The media and adventitia were normal. The lungs showed little evidence of chronic passive congestion or of obstruction of the pulmonary venous system. In 40 to 45 cases of this sort which have been published in detail, the symptoms and anatomical changes are identical, but the aetiology remains obscure.—*Obliterative Pulmonary Arteriolosclerosis, W. G. MacCallum, Bull. Johns Hopkins Hosp., July, 1931, xlix, 37.*—(*R. M. F.*)

Psittacosis.—Three cases of psittacosis with two deaths are reported. The first patient had cared for a sick budgerigar. The other two patients had cared for the first patient but had not come in contact with the bird. One autopsy showed a haemorrhagic bronchopneumonia, with an abundance of albuminous and haemorrhagic exudate and the presence of conspicuously large desquamated epithelial cells. There was almost complete absence of fibrinous exudate and capillary and arterial thrombosis. Many bacteria of many varieties were found. Virus bodies were found in the spleen. These cases suggest that psittacosis is still liable to occur in this country and should be borne in mind whenever there is an influenzal type of illness with early signs in the lungs or typhoid-like symptoms.—*Three Cases of Psittacosis with Two Deaths, H. R. Fisher and R. J. Helsby, Brit. M. J., May 23, 1931, no. 3672, 887.*—(*M. E. P.*)

Pneumonoconiosis.—This is a review of the literature on pneumonoconiosis, including its experimental aspects. The author adds the reports of 12 cases of which the postmortem findings only are reported. The conclusion is reached that the silicotic nodules are caused (1) by blocking the lymphatics, (2) by interstitial pneumonic processes, (3) by focalized chronic pneumonic processes and (4) by alterations in the vessel-wall. It remains still an open question whether pure silicosis, without the advent of tuberculosis, may produce large nodular lesions.—*Beitrag zur Frage der Staublungenerkrankung, A. Rainer, Wien. klin. Wchnschr., July 31, 1931, xliv, 991 & August 7, 1931, xliv, 1025.*—(*M. P.*)

Roentgenological Study of Coal-Miners' Lungs.—A study of X-ray films of healthy coal-miners has revealed some interesting data. Among 48 coal-hewers, the films of 26 revealed an abnormal appearance: in 18 of these the signs were bilateral and generalized. These signs occurred in those with a "high average age, high average of underground years, and definitely with a low average height and chest expansion." The average weight of those with extensive changes is below that of the general average. Among 41 healthy miners of two separate

districts, the films of 21 revealed generalized mottling which resembled that induced by silica dust. Among 42 healthy miners, who have been employed for 15 or more years in the coal industry but who have not worked in "hard headings" (earth, silica, etc., lying between seams of coal) and who have worked mostly in anthracite coal, a large percentage yielded films that showed mottling which occurred at a fairly early age and which increased with age. However, well marked X-ray changes appear to be quite consistent with health. In general it may be concluded that (1) prolonged exposure to the working conditions incident to coal-mining frequently leads to a coarse mottling throughout the pulmonary fields as seen in the X-ray film; (2) these changes resemble those present in pneumonoconiosis; (3) they increase with prolongation of employment; (4) they are consistent with working health but are associated with a diminished vital capacity, loss of weight and shortness of breath; (5) they may or may not have an influence on the respiratory conditions common in old coal-miners, but they are not associated with any marked liability to tuberculosis, such as is so striking among people with silicosis; (6) the opacities (mottled areas) are due to fibrosis and this latter may be "associated with an abnormal amount of silica in the lung ash and the retention of excessive coal dust in the lung tissues."—*Coal Miners' Lung: a Radiographic Study of Certain Groups of Industrially Healthy South Wales Coal Miners, The King Edward VII National Memorial Association* (*A. Brownlee, E. Folliott, J. C. Gilchrist, R. M. Hiley, W. Davies, A. C. Johnson, J. L. Thomas, N. T. K. Jordan and L. R. Clark*), *J. Industr. Hyg., January, 1931, xiii, 19.*—(*H. S. W.*)

Silicosis.—This report is based on observations on 240 autopsies on miners of the Ruhr district. In 205 cases nodular silicosis was present, in the majority of the cases combined with tuberculosis. The most important minerals to cause nodular fibrosis are silicates. The size of the particles varies between 0.25 and 5 micra. The pathologico-anatomical picture of nodular silicosis is as follows: In the mildest form both lungs are studded with gray or black, hard, little nodules which do not follow the larger trunks. The hilar lymph nodes are black, enlarged and hard. The pulmonary parenchyma shows large alveoli or bullous emphysema. In more advanced cases the nodules are larger and may coalesce. In the most far-advanced cases entire lobes may be transformed into hard, dark, fibrous masses, leaving only the apical portions and the anterior and inferior margins free. The pleura is usually thickened. In most cases extensive pleural adhesions are present. Chronic bronchitis is frequent. The single nodules are composed of connective tissue, frequently hyalinized, and containing few cells. There are dust deposits, but it is sometimes impossible to differentiate histologically whether they consist of coal-dust or silicates. The hilar lymph nodes show similar involvement. Sometimes, nodules are absent in lungs of miners who have been exposed to silicate dust for many years. These lungs show far-advanced emphysema, massive anthracosis and an increase of the connective tissue along the bronchi and larger vessels. The hilar lymph nodes show the same changes as those of silicotic lungs. These cases of chronic fibroblastic lymphangitis and lymphadenitis indicate that the inhalation of mineral dust alone does not necessarily produce nodular silicosis. In regard to the combination of silicosis and tuberculosis two different types can be distinguished. In one type the tuberculous foci seem to be superimposed on the silicotic lesions. In the other type the two tissue changes appear to be combined in one and the same focus. In all advanced cases of silicosis the right heart is hypertrophied, the pulmonary artery shows dilatation and frequently focal sclerosis, and the lung shows massive emphysema. A presenile osteoporosis with kyphosis of the thoracic vertebrae was seen frequently. Tumors were very rare and there was not a single case of pulmonary carcinoma. Silicosis of any degree was seen with and without concomitant tuberculosis. Of 173 individuals who had far advanced silicosis 69 per cent showed active tuberculosis. The youngest patient who died with extensive silicosis was 37 years old. In the most advanced cases the cause of death was circulatory failure 76 per cent, pulmonary tuberculosis 9 per cent, and pneumonia 14 per cent. In the total number of cases pulmonary tuberculosis was a much more frequent cause of death. The duration of exposure varied from 3 to 35 years. The average is between 14 and 23 years. After symptoms of silicosis, such as dyspnoea on exertion, circulatory insufficiency, or symptoms of tuberculosis have appeared, the duration of life was found in 175 cases as follows: Thirty-one patients died within the first year. After 4 years 36 were still alive and after 6 years 3 were alive. Schridde has claimed that the development of silicosis presupposes a constitutional tendency to keloid formation. None of the observed cases showed keloid transformation of a scar. It is still undecided whether nodular pneumonocon-

iosis develops without the interference of tuberculosis. In 17 cases of apparently pure silicosis (that is, without evidence of tuberculosis) guinea pigs were infected with material from the pulmonary lesions. In 70 per cent of these cases the guinea pigs developed generalized tuberculosis. The conclusion is reached that the silicotic nodules are scars of healed tuberculous foci. The chronic fibroblastic lymphangitis and lymphadenitis with pulmonary emphysema is the genuine pure pneumonoconiosis. This disease does not produce larger nodules. The nodular pneumonoconiosis is a combination of silicosis and tuberculosis. The pulmonary tuberculosis in these cases has a very chronic course because the inhaled silicates produce fibrosis. If in these cases the allergy remains high, the patients die eventually of circulatory failure. If for some reason the allergy decreases, the tuberculous process is reactivated and the patients die of pulmonary tuberculosis. The relation of the weight of the right cardiac muscle to weight of the left cardiac muscle is normally about 0.55. In advanced cases of pneumonoconiosis the ratio was found to be, on the average, 0.94, and extreme cases showed this ratio as high as 1.52. These figures express clearly the enormous hypertrophy of the right heart due to the burden on the pulmonary circulation.—*Die Steinstauberkrankungen der Ruhr-Bergleute, K. Husten, Klin. Wchnschr., March 14, 1931, x, 506.*—(*M. P.*)

Pulmonary Asbestosis.—A case of pulmonary asbestosis, previously reported in the *British Medical Journal* as being the first in which the relationship between the inhalation of asbestos dust and fibrosis of the lung could be satisfactorily established, has been subsequently studied and the after-history obtained. The patient, a man aged forty-two, had been associated with the asbestos industry since boyhood. The total period of employment in the industry was 24½ years, for 23½ years of which he was definitely exposed to the inhalation of asbestos dust. He first sought medical advice in February, 1928, complaining of cough, breathlessness, loss of weight and lassitude, extending over a period of several months. Physical findings and radiographic examination revealed widespread fibrosis and bronchitis. He died December 30th, 1930, and the pathological examination showed the death due solely to cardiac failure secondary to back pressure resulting from the massive generalized fibrosis. Asbestosis bodies were abundantly present in all areas of both lungs. The bodies were generally golden-yellow in color, and of great variety of shape and size. Many showed a core, thought to be asbestos fibre, running down the centre of the body. The deposit gave the prussian-blue reaction for iron. Much yellow pigment in the form of granules and globular masses was found lying free or phagocytosed inside air-vesicles and bronchioles, and embedded in the alveolar walls or in the interstitial connective tissues. Much of the finer dust was found within the endothelial cells of blood-vessels and in the peribronchial lymph nodes. A large amount of black carbon was present throughout the tissues.—*A Case of Pulmonary Asbestosis, H. E. Seiler and M. D. Gilmour, Brit. M. J., June 27, 1931, no. 3677, 1112.*—(*M. E. P.*)

Experimental Asbestosis.—Asbestos is a product composed chiefly of magnesium silicate, in crystalline, hydrated form, with a formula: $3\,MgO2SiO_2.2H_2O$. It usually contains numerous impurities, especially ferrous substances. It contains free silica in a strength of about 2.6 per cent. The commercial product appears microscopically as fine particles and long slender filaments, some of them 200 micra in length. It is surprising that fibres of such length could be inhaled to the deeper portions of the lung. Guinea pigs, rats and rabbits have been exposed to heavy concentrations, some of them for longer than two years. Some of these were infected with tubercle bacilli at the beginning of the exposure to dust, some during or after prolonged exposure, and many were left uninfected in order to reveal the effect of the dust *per se*. Guinea pigs, killed after as long as 847 days' exposure to the inhalation of this dust, as well as those that had had a much shorter exposure, revealed a different localization than that of other inhaled particulate matter. Asbestos dust is composed largely of elongated fibres, and it seldom reaches further than the respiratory bronchioles, whereas the other dusts tend to be deposited in the terminal air sacs and alveoli. Along these bronchioles, cellular (phagocytic) reaction takes place after a few months and fibrous tissue is present after nearly two years of exposure. "Asbestosis" bodies are abundant in these peribronchiolar regions, but are scarce elsewhere. Drainage to the tracheobronchial nodes is slow, although there is an early dilatation of the pulmonary lymphatics. In animals, after 782 and 840 days' exposure, the pleura is grossly involved with minute subpleural grayish-white nodules of 1-mm. diameter and similar structures are present throughout the lungs. Pleurisy is not uncommon in animals of long exposure. After one year's exposure

the X-ray films of guinea pigs reveal pathological changes. One lot of 63 normal guinea pigs was infected by inhalation with the well known R1 strain, a tubercle bacillus of low virulence. Two-thirds of these were placed in an atmosphere of asbestos dust, in which the surviving ones have remained for 2¼ years. Of 31 of these now dead, 10 revealed evidence of spread of their tuberculosis and in four of these pulmonary cavitation developed. This slowly spreading disease was of the fibrous type. Of the 23 controls one showed progressive disease. Foci of tuberculosis develop in the dusted animals in the depths of the lung (in lymphoid tissue) as well as in the periphery. Many of these heal spontaneously, but many also, if associated with the dust in the peribronchial areas, develop into areas of extensive chronic inflammation, which may resolve or proceed to progressive tuberculosis as endogenous reinfection. The latter is usually limited to the portions of the lung in which it developed and rarely leads to death. It may clear also and leave much scarring and distortion. Other guinea pigs were similarly infected after they had had prolonged exposure to asbestos dust. Of those in this group which died early, several showed tubercles in the peribronchiolar regions rather than more peripherally; they showed evidence of early metastasis to the tracheobronchial lymph nodes. In those examined after the 33rd day following infection, extensive tuberculosis of the spleen and hepatic lymph nodes was present. The superimposition of tuberculous infection upon asbestosis causes a very great increase in the fibrosis which is incident to the latter. When caseation occurs in areas where asbestosis bodies are present, it destroys them.—*Studies on Experimental Pneumonokoniosis. VI. Inhalation of Asbestos Dust: Its Effect upon Primary Tuberculous Infection, L. U. Gardner and D. E. Cummings, J. Industr. Hyg., February and March, 1931, xiii, 65 & 97.*—(*H. S. W.*)

Asbestosis Bodies.—No asbestosis bodies have been found in crude asbestos, and it seems practically certain that they are produced in living tissues from inhaled asbestos fibres. They are nearly always present in the pulmonary fibrosis associated with asbestos workers, and in no other condition. The asbestosis body would appear to be formed from the original fibre by a process of deposition of some material (probably containing iron) around the fibre so as to thicken it. Fissure or cracking of this material gives rise to the appearance of segments. Fractured portions of the deposited material separate off from the asbestosis body and give it the characteristic appearance. The body stains black when brought into contact with ammonium sulphide, the group reaction for iron, and this color is lost when hydrochloric acid is added.—*The Formation of the Asbestosis Body in the Lung, S. R. Gloyne, Tubercle, June, 1931, xii, 399.*—(*M. E. P.*)

Pulmonary Asbestosis Bodies in Faeces.—Asbestos fibres have been found in the upper respiratory tract of workers in factories using asbestos. When they find access to the lungs or intestinal tract, they form asbestosis bodies, which may also be isolated in the sputum or faeces. The author found these bodies in the faeces of a patient with large numbers in the sputum. Especially is the study of the faeces important in those patients who have no available sputum.—*The Presence of Asbestosis Bodies in the Faeces in a Case of Pulmonary Asbestosis, S. R. Gloyne, Tubercle, January, 1931, xii, 158.*—(*M. E. P.*)

Tuberculin Testing in Coccidiosis.—A disease has been observed in man and cattle during the last few years (especially in California) which resembles tuberculosis but is caused by *Coccidioides immitis*. It has been found in 246 human beings. The lesions in animals consist of well-encapsulated abscesses, usually smaller than 8 mm. in diameter. They are in the tracheobronchial lymph nodes particularly, and resemble both actinomycosis and tuberculosis. The disease tends to remain localized unless infection be intravenous, when rapidly spreading disease and death ensue. In human beings the skin is involved especially. A "coccidioidin" has been prepared from this mold, which leads to a high percentage of reactions in infected animals. And, interestingly enough, tuberculin will frequently lead to a mild reaction.—*Coccidioidal Granuloma: Occurrence in Animals. Reference to Skin Tests, M. D. Beck, J. Traum and E. S. Harrington, J. Am. Veter. Med. Assn., April, 1931, lxxviii (n. s. xxi), 490.*—(*H. S. W.*)

Actinomycosis in Childhood.—Among 450 cases of actinomycosis examined in the Mayo Clinic, the 14 cases which occurred in children (2 to 15 years) are reported in detail. In ten of these the cervicofacial area was involved and in four the abdomen. Three of the latter showed evidences of thoracic lesions. In none of the 14 was there a history of trauma preceding the onset as contrasted to the frequent occurrence in adults of such factors as dental extraction or penetration of the oral or pharyngeal

mucous membrane by grain beards or grasses. Diseased tonsils and carious teeth may have been factors in some children and in two of the abdominal cases the onset of symptoms followed appendectomy. With the exception of two of the children with cervicofacial lesions, discharging sinuses were present in all. Actinomyces was demonstrated in every case, although in only four was this possible at the first examination. The treatment consisted of potassium iodide by mouth to the point of tolerance, radiotherapy, and local surgical measures. Prognosis in the cervicofacial types is good, in the abdominal and thoracic types, bad.—*Actinomycosis in Childhood, F. A. Figi and R. E. Cutts, Am. J. Dis. Child., August, 1931, xlii, 279.*—(*M. D.*)

Actinomycosis in Childhood.—In a survey of 670 cases of actinomycosis, Sanford and Voelker (1925) found 45 cases in children. The author reports 6 cases. In children, as in adults, one-half of the cases begin with lesions about the head and neck. *Actinomyces bovis* is a normal inhabitant of the secretions of the mouth and gastrointestinal tract. The primary focus is frequently the mandible, the process starting about the socket of a diseased tooth. The lesion may extend by continuity to tonsil, neck and face. Twenty-one per cent of the cases in children involve the thoracic viscera, primary lesions probably from aspiration, secondary lesions by extension from oesophagus or abdominal organs. In the lungs the disease may be of a pneumonic or pleuropneumonic form, with foetid or bloody sputum, which may contain sulphur granules, and with cough, signs of consolidation or cavitation, cachexia, anaemia, fever, and often a tuberculous habitus. Extensive infiltration of the mediastinum produces signs and symptoms of mediastinal tumor. In children the disease arises in the abdomen as frequently as in the chest, the appendix and caecum being primary sites. Extension from the thorax to the abdomen may occur. Involvement of the liver is frequent. The disease may be acute, but it is usually chronic. Skin, kidney, suprarenal glands, and central nervous system are unusual sites for primary actinomycosis. The characteristic pathology of the disease comprises the growth of granulation tissue, with the formation of abscesses containing yellow pus and sulphur granules, and a marked tendency to fibrosis. The disease may be confused with septic infection, neoplasm and tuberculosis. A positive diagnosis depends on demonstrating actinomyces. Treatment consists of general hygienic measures, iodides, copper salts, vaccines, roentgenotherapy, and surgical measures when indicated.—*Actinomycosis in Childhood, A. C. Edwards, Am. J. Dis. Child., June, 1931, xli, 1419.*—(*M. D.*)

Leukaemia in Tuberculosis.—Several cases are reported in which tuberculosis was complicated by leukaemia. It is emphasized that tuberculosis may produce an aleukaemic blood-picture in the presence of a true leukaemia. One case is reported in which a lymphatic leukaemia terminated in Hodgkin's disease. The clinical picture of patients suffering from the combination of leukaemia and tuberculosis is characterized by fever, an unusually large splenic tumor and by leukopoenia with a relative lymphocytosis and monocytosis; in addition there is a secondary anaemia. Immature cells may occur in the blood. In lymphatic leukaemia few myelocytes may also occur. A considerable percentage of these patients die of miliary tuberculosis.—*Beobachtung über die Wechselwirkung zwischen Leukämie und Tuberkulose im menschlichen Organismus, G. Holler, Klin. Wchnschr., September 5, 1931, x, 1663.*—(*M. P.*)

Polycythaemia Vera.—Four cases of polycythaemia and chronic pulmonary disease with blood-volume comparable to that seen in polycythaemia vera are reported. Treatment in these cases was by the administration of phenylhydrazine hydrochloride. There was a definite reduction in the blood-volume with clinical subjective and objective improvement. Because of the high blood-volume and a good response to treatment by distinction of blood these cases are best considered as polycythaemia vera with associated or complicating pulmonary disease.—*Polycythaemia Vera and Chronic Pulmonary Disease, N. W. Barker, Arch. Int. Med., January, 1931, xlvii, 94.*—(*W. I. W.*)

Treatment of Tuberculous Diabetics.—It is a well-known fact that diabetics have a low resistance to tuberculosis and that usually their lesions progress rapidly. Even if the blood-sugar is kept down within normal limits by proper diet and insulin administration, diabetics do poorly in regard to tuberculosis. It could be assumed that the reduced carbohydrate metabolism in the tissues is the reason for this poor reaction. Several diabetics with progressive tuberculous lesions were therefore put on a diet rich in carbohydrates and low in fat and protein. Simultaneously a sufficient amount of insulin was given. The results in regard to tuberculosis were excellent. After the tuberculous lesions had improved the sugar toler-

ance was increased. It is emphasized that such results may be obtained only if the diet rich in carbohydrates is continued for several months.—*Ueber die Behandlung tuberkuloser Diabetiker, H. Kutschera-Aichbergen, Wien. klin. Wchnschr., September 25, 1931, xliv, 1217.*—(*M. P.*)

Syphilis of Lung.—Virchow first centered attention on the subject of pulmonary syphilis (white lung, *pneumonia alba*), and his detailed description of the changes occurring in the lungs of the syphilitic newborn infant served as a basis for further research. In a review of the cases of pulmonary syphilis reported between the years 1854 and 1906, 65 were found. Of these, seven were in newborn infants and fifty-eight in adults. The diagnosis of pulmonary syphilis was based on the results of antisyphilitic treatment in 35 cases, and in 23 cases the diagnosis was verified at autopsy. In 1907 the X-ray was begun as a diagnostic measure in pulmonary syphilis. The literature between 1906 and 1920 yielded 16 cases, the diagnosis of which rested on the results of antisyphilitic treatment and on 25 cases, in which the diagnosis was verified at autopsy. There were also 12 cases in which the diagnosis was based on X-ray evidence and two in which observations by both the X-ray and autopsy were recorded. Since 1920 additional cases have been reported. Syphilis of the lungs is an uncommon disease. Letulle writes: "In spite of its rarity, white lung of the new-born has been described in detail and accepted while the existence of pulmonary syphilis in the adult, which, according to some observers, is not more rare, remains a debatable question." Osler saw 12 cases of pulmonary syphilis in 280 autopsies, whereas the Jefferson Chest Hospital reported 4 cases in 1,200 autopsies. According to Karshner and Karshner, in 118 cases the age-incidence ranged from two to ninety-eight years. The average was 36 years, the disease being commonest in the early thirties. The disease affected males more than females in the ratio of about 2:1, or 76 males to 42 females. The number of deaths due to the disease was greater in the females (21 deaths in 42 cases) than in the males (31 deaths in 76 cases). In the adult, pulmonary syphilis usually affects one lung, the right more frequently than the left. The lower lobe of the right lung appears to be the site of predilection. Either lung or any region of either lung may, however, be affected,—even the apex, the location that earlier observers considered the favorite site for tuberculosis. In 1907 Buchanan described a case of a man who, for one year, had had a condition diagnosed as pulmonary tuberculosis, though the sputum was negative. A roentgenograph showed areas of infiltration in the bases of both lungs. These cleared under antisyphilitic treatment. The X-rays establish a point of contact between clinical observation and autopsy findings. It may be possible to state from observation of a film where the site of the lesion is, but it is not possible to say that the lesion is syphilis. The shadows seen in the film may be due to fibrosis sufficient to arrest the rays. This fibrosis may be in the bronchi, blood-vessels or interstitial tissue. Of the three sites the bronchial is the most common. When cardiovascular syphilis already exists and suspicious shadows are seen by X-ray, the question arises: Do these shadows represent bronchial fibrosis or fibrosis of the pulmonary artery? It has been said that syphilis respects the integrity of the blood-vessels and, when cardiac syphilis exists, primary syphilis of the lung is ruled out as a cause of the shadows seen. In cases of proved pulmonary syphilis, fibrosis of the bronchi, if present, shows in the X-ray as more or less serrated fibrous tracts. These tracts radiate from the point where the main lesion is located. Large cicatricial tracts cast polycyclic shadows. The arborescent tracts are fan-like and can be traced to their ultimate ramifications. Between these tracts are areas due to perilobular and interlobular fibrosis. Roentgenologically the fibrosis in syphilis cannot be distinguished from that in tuberculosis, but sclerosis localized at the hilum, calcification or cavity points to tuberculosis, and peribronchial sclerosis with the formation of rings points to syphilis. These rings are probably due to fibrosis around the bronchi and that portion of the bronchial tree near the median line, and may occur in groups of three or four. Following the oblique direction of bronchi one may find black half-circles or a more or less elliptical shadow devoid of lumen. Arborescent tracts, diffuse fibrosis radiating in all directions from and along bronchi even to their termination, more or less marked emphysema and an enlargement about the hilum are some of the aspects of pulmonary syphilis. According to Watkins pulmonary syphilis must be differentiated from bronchiectasis, abscess, malignant growth, pneumonoconiosis, unresolved pneumonia and tuberculosis. Shadows due to carcinoma will give sharp margins, while syphilis has irregular borders. Cavity is rarely present in pulmonary syphilis. Pneumonoconiosis resembles syphilis and tuberculosis combined. As a rule the shadows due to syphilis are in the lower and middle lobes, while those due to tuberculosis are in the upper lobes. The densest shadow

in syphilis begins at the hilum and diminishes toward the periphery, while in tuberculosis the characteristic shadows are about the apical and subapical regions. The demonstration of spirochaetes in the sputum or tissue establishes the diagnosis.—*Pulmonary Syphilis: Its Frequency, Pathology and Roentgenologic Appearance, M. C. McIntyre, Arch. Path., February, 1931, xi, 258.*—(*J. S. W.*)

Haematology of Hodgkin's Disease.—The blood-picture was studied serially in 32 cases of Hodgkin's disease all of which have been confirmed by histological examination of biopsy or autopsy material. In regard to the quantitative alterations of the blood-picture 3 groups of patients were differentiated. In the first group both erythrocytes and leucocytes did not deviate markedly from the normal values. These patients showed involvement of only a few groups of lymph nodes, or they were in a stage of remission. The general condition of all these patients was satisfactory. In the second group marked leucocytosis was found. In some cases this was combined with a red count of more than 5,000,000. The patients in this group showed chronic generalized disease with periodic fever or tumor-like lesions. With progressive deterioration the number of leucocytes and erythrocytes decreased. The third group of patients showed leucopoenia and anaemia, usually progressive. The lowest values were 700,000 red cells, 25 per cent haemoglobin and 1,600 leucocytes. The leucopoenia usually preceded the anaemia. These blood-pictures were usually found in rapidly progressing disease and in patients who developed cachexia. The localization of the lesions was usually in the abdomen and in the bones. Qualitatively the red cells showed no marked deviation from normal. In some patients, who were dyspnoeic due to compression of the trachea or bronchi, normoblasts were occasionally seen; the same was true in some patients with severe anaemia. The thrombocytes were normal. In the patients who had leucocytosis the differential count showed an absolute and relative increase of neutrophilic leucocytes. A shifting to the left occurred only in patients with rapid progression. Leucopoenia was always associated with a marked reduction of the neutrophilic leucocytes. Eosinophilia was very rare, while lack of eosinophilic leucocytes was noted in patients with leucopoenia. In almost all cases the monocytes were increased. The most constant finding was a progressive lymphopoenia which was absent only in initial stages. Exactly the same types of blood-picture were found in lymphosarcomatosis and tuberculous granuloma. The blood-picture is, therefore, in no way diagnostic. Prognostically, however, the blood-picture is of importance. Patients with leucocytosis survive longer. The degree of lymphopoenia indicates the severity of the outlook.—*Ueber Blutbefunde bei Lymphogranulomatose, R. Klima, Wien. klin. Wchnschr., April 3, 1931, xliv, 445.*—(*M. P.*)

Cancer of Lung.—The roentgenological diagnosis of pulmonary cancer is difficult because a great variety of pictures can be produced by cancer and its frequent complications, and because other diseases may simulate the characteristic appearance of cancer. Six forms of cancer are differentiated: (1) strictly intrabronchial tumors, (2) carcinomatous pneumonia, (3) hilum cancer, (4) lobar cancer, (5) carcinomatous lymphangitis, and (6) intralobar carcinomatous nodules. Roentgenological signs which indicate tumors or malignant processes are an abnormally convex lobar border, and blurred lobar borders indicating destructive processes, both of which signs may help to differentiate lobar malignant tumors from other lobar processes. More frequently the diagnosis is aided by typical complications, such as bronchostenosis, atelectasis, metastasis to the parenchyma, the thoracic keleton and the mediastinal lymph nodes. Pneumonia and pleural effusions obscure frequently the characteristic roentgenological picture. Bronchography and radiation therapy may help to establish the diagnosis.—*Das Bronchuskarzinom, R. Lenk, Wien. klin. Wchnschr., September 25, 1931, xliv, 1228.*—(*M. P.*)

Primary Cancer of Lung.—Ferenczy and Matolcsy have recently published a statistical report on primary cancers of the lung which were found among approximately 67,000 autopsies performed in the Pathological Institute of the University of Vienna within a period of 30 years. This study showed a marked increase in the frequency of pulmonary cancer. The present article is designed to continue the above work for the 5-year period, 1926 to 1930, comprising a total of 14,039 autopsies. It is shown that the percentage of primary cancer of the lung increased during this period both in relation to the total number of autopsies and in relation to the total number of cancers. This latter increase is particularly marked since 1915. In 1914, 2 per cent of all cancers were primary in the lung, in 1915 it was 6.36, in 1924 it was 10.3 and in 1930 it was slightly less than 10 per cent. The right lung was slightly more often involved than the left. Of all patients 45.5 per cent were in the

6th, 26 per cent in the 7th and 15.7 per cent in the 5th decennium. Seventy-seven per cent of the patients were male. In approximately 10 per cent of the cases pulmonary tuberculosis, usually not progressive nor extensive, was found coincidentally. In most cases metastases were present. With the exception of the involvement of the regional lymph nodes the liver was most frequently the site of metastasis; next follow skeleton, lung, adrenals, kidneys and brain. Rarely were metastases found in the pancreas and the thyroid, serous membranes, in muscles and in the subcutaneous tissue. Of the 165 cases of pulmonary cancer which were observed, in 48 per cent the clinical diagnosis was correct.—*Ueber das primäre Lungenkarzinom, S. Zacherl, Wien. klin. Wchnschr., July 24, 1931, xliv, 967.*—(*M. P.*)

Sarcoma of Lung.—A woman, 35 years of age, complained of feeling "run down" and having headaches for two weeks. On admission to the hospital she had no symptoms except severe headaches, weakness, and loss of memory. Examination suggested a right-sided cerebral lesion. Operation was considered, but pulmonary oedema with dulness and almost absent breath-sounds over the right lower lobe contraindicated interference. Death ensued after one month of illness. The autopsy revealed a new growth in the posterior part of the right lower lobe of the lung, and numerous nodular deposits in the brain. No metastases were found elsewhere. The microscopic examination of the specimens from the lung and the brain showed a round cell sarcoma. It is of interest that intracranial abscesses complicating pulmonary suppuration usually show a similar distribution to the metastases found in this tumor. *A Case of Pulmonary Sarcoma, O. W. Roberts, Lancet, April 25, 1931, ccxx, 917.*—(*R. D.*)

Sarcoma of Lung.—A case is reported of a man, 52 years of age, who was gassed, while serving in the army, in 1917. Subsequently, because of cough, haemoptysis, and infiltration of both upper lobes of the lung, pulmonary tuberculosis was diagnosed. He died in September, 1930, and autopsy revealed a small-celled sarcoma of the upper lobe of the right lung with fibrosis but with no evidence of tuberculosis.—*Sarcoma of the Lung, H. E. Collier, Brit. M. J., April 18, 1931, no. 3667, 666.*—(*M. E. P.*)

Tracheal Tumors.—Primary tumors of the trachea are of infrequent occurrence. A review of the literature through 1929 shows a total of only 351 cases, of which 119 were malignant. In comparison the incidence of laryngeal tumors is about 100 times as great. The simple and rigid structure of the trachea and its passive function are probably significant factors in the infrequent occurrence of these tumors. One case of adenocarcinoma is reported. A man, 23 years of age, had noted difficulty in breathing for six months. Examination having revealed a tracheal growth attached to the anterior wall, it was removed by open operation under procaine anaesthesia. The tumor was irregular in shape, and about the size of a cherry. It was soft and grayish-pink in color. On section there were no special features. The microscopic diagnosis was adenocarcinoma. Twenty months after operation the patient was in good health with no evidence of recurrence.—*Primary Tumors of the Trachea: Report of a Case and Review of the Literature, R. D'Aunoy and A. Zoeller, Arch. Path., April, 1931, xi, 589.*—(*R. D.*)

Primary Neoplasms of Pleura.—Although primary pleural neoplasms are classed among the rarer types of tumors, their importance has been recognized in a rather extensive literature. Their histogenesis and their classification are still subjects of controversy. Macroscopically the tumors may be sharply divided into two main groups. The first consists of those of a diffuse nature, involving the entire pleura and usually ensheathing the lung in tumor tissue. The second group is mainly of academic interest, but one such tumor is described in the second part of the article. Localized tumors of the pleura may involve the parietal or the visceral layer. They comprise many histological types and benign and malignant forms. The entire group is possessed of a common characteristic: they originate from the tissues beneath the superficial living cells, in contradistinction to the diffuse form of pleural tumors, which probably arise from the surface lining. Tumors arising from beneath the parietal pleura of the chest-wall vary greatly in their histological structure because of the number of different structures that are present in the region, in addition to the subserous areolar tissue. An important group of the localized subpleural connective-tissue neoplasms are the so called giant-cell sarcomata of the visceral pleura. Their pathological interest lies in the fact that the tumors described in the literature did not metastasize or infiltrate, in spite of the microscopic picture of sarcoma. Clinically they are of importance because, if diagnosed early enough, they may be removed, and because, if neglected, they cause death from disturbances in circulation due to the extreme

proportions to which they grow. The literature on these giant tumors of the visceral pleura is reviewed and four new cases are reported. *Case 1:* A woman of 48 had had a slight cough for a number of years. Roentgenograms showed a large round shadow in the left hemithorax. A thoracotomy was done, and a tumor was found situated in the anterior portion of the left chest, connected with the lung by broad bands and loosely adherent to the chest-wall and to the pericardium. It was completely removed. Microscopically it was a fibrosarcoma. *Case 2:* A man of fifty-three, who had pain in the left side of the chest for three years. After roentgen examination operation was done and the pleural cavity was found to be obliterated by firm adhesions. Beneath the pleura there was a large, hard, whitish-gray, dense, fixed mass. Because of the extensive adhesions this could not be removed. Microscopic examination showed typical fibrosarcoma. The patient was treated with deep irradiation. Four years later, because of increased symptoms, the left side of the chest was opened again and numerous particles of neoplasm removed. At this time the X-ray revealed two sharply circumscribed masses in the right lung. Microscopically, multiple specimens showed a polymorphous, spindle-cell sarcoma with areas of myxosarcoma. *Case 3:* A pleural tumor in a woman aged 50. Ten years previously she had been hospitalized with a history of cough, expectoration and dyspnoea of twelve years' duration. There had been occasional blood-tinged sputum. Later roentgen examination revealed a large round shadow in the right hemithorax which was interpreted as a sacculated aneurysm of the first portion of the aorta. The patient slowly grew worse and, on her fifth and last admission to the hospital, dyspnoea was extreme and there was marked cyanosis. Roentgen examination showed that the shadow had increased considerably. Pulmonary oedema developed and the patient died. Autopsy disclosed a large whitish oval tumor, arising from the mesial aspect of the right upper lobe, lying between the lung and the anterior mediastinal structures and extending from the dome of the pleural cavity almost to the diaphragm. There was some doubt as to the nature of the various histological elements of this tumor, but it was concluded that the tumor represented a neoplastic overgrowth of embryonic connective tissue. In this respect it differed from the ripe fibroma which structurally simulates mature connective tissue. However, it differed from fibroblastic sarcoma in that it retained the typical structure of the mother tissue in contradistinction to the atypism of malignant connective-tissue tumors. *Case 4:* A man of forty-one, who had been suffering from a neoplasm in his right chest for over ten years. The patient died of cardiac failure two days after admission to the hospital. At autopsy the right side of the chest was filled with a soft tumor mass adherent to the parietal pleura of the anterior and lateral chest-walls. There was a thick band between the lower surface and the diaphragm and a flat band binding the upper pole of the tumor to the inferior border of the middle lobe. Microscopic examination of the tumor showed typical lipoma. It caused death merely because of the tremendous proportions to which it had grown. Diffuse neoplasms of the pleura arise from the surface lining cells, the mesothelium, and should be designated as mesothelioma. However, all tumors of the pleura should be considered as metastatic if there is present in one of the viscera a neoplasm that can be considered as primary. A case is reported of a woman, twenty-six years old, who had been suffering from pain in her left chest for eleven months. Roentgen examination showed a diffuse shadow over the entire left pulmonary field. The patient died in three days. Autopsy showed the left lung completely ensheathed by firm, nodular, whitish, fibrous-tumor tissue. The bronchi showed neither infiltration nor narrowing of the lumen. The lung itself was infiltrated extensively in an irregular manner. The primary origin of the tumor in the pleura was not questioned, as there was no suspicion or evidence of any new growth in any other region of the body. The striking peculiarity of the histological picture was the fact that the tumor was composed of cells of epithelial appearance which were almost everywhere separated from each other by collagen fibres. The complex structure of the tumor is explained by the varied potentialities of the mesothelial cells, as shown by their histogenesis and by experiment.—*Primary Neoplasms of the Pleura. A Report of Five Cases, P. Klemperer and C. B. Rabin, Arch. Path., March, 1931, xi, 385.*—(*J. S. W.*)

Leiomyosarcoma of Pleura.—A white woman, 83 years of age, was admitted to the hospital with a diagnosis of arteriosclerosis. Examination at that time and during her stay of 27 days revealed no signs of intrathoracic growth. At autopsy a rounded tumor, 22 x 18 x 8 cm., was found in the left thoracic cavity. Its cut-surface was smooth except for a few projecting nodules, some of which were deep red, while others were pearly white. There were no tumor metastases in the lungs or elsewhere. The diagnosis of arteriosclerosis was con-

firmed. Microscopic examination of the tumor with several stains revealed two types of cells. In one the cytoplasm consisted of homogeneous narrow bands prolonged from the nuclear poles, or of delicate projections from the nuclear periphery. The other was a fibrillar connective tissue. The mass was well encapsulated by the pleura, in which, near the hilum, there were distinct bundles of smooth-muscle fibres that apparently passed rather abruptly into the large cells of the tumor. The left lung was uninvolved. This neoplasm is characterized as a leiomyosarcoma, arising from the smooth muscle of the pleura.—*Leiomyosarcoma of the Pleura, L. Catron, Arch. Path., June, 1931, xi, 847.—(R. D.)*

Prognosis in Tuberculosis.—At the beginning of each case of pulmonary tuberculosis we can conceive of a certain virulence of the infecting bacteria and a certain resistance of the host. In the contest waged between these two factors there are many influences which may affect the outcome. Not least among these is the psychological reaction of the patient while he is endeavoring to take the cure. The poisons of the disease seem to affect the centres of nervous and mental control, producing an unstable equilibrium. The patient is not only physically, but mentally and nervously sick, and, as is well known, the emotions have a direct effect on the functions of the body. The physician who deals with tuberculosis must understand not only the disease but human nature and its peculiarities. It is on his ability not only properly to understand and control his patient, but to buoy him up and inspire him cheerfully to continue for perhaps months or even years what would otherwise seem a monotonous and hopeless task, that a favorable prognosis often rests. From a psychological consideration the first step which makes for a favorable prognosis is truthfully to explain to the patient the extent of his disease as well as the nature and purpose of the cure. It is the uncertainties of life, whether they have to do with health or other serious matters, that cause worry, restlessness, and emotional disturbance, and a simple but frank explanation of the facts goes a long way toward establishing that bond of confidence which should exist between patient and physician. At the same time there are very few patients who cannot face the truth if it is put up to them optimistically. Since time is such an important factor in the prognosis it is most necessary to give the right perspective and to arm the patient for the steady pursuit of health. It is to be recognized that it is easier to take the cure consistently among those who will give their moral support and sympathy and under the care of those who understand and appreciate the nervous and mental disturbances incident to the disease. The physician's ability properly to advise, intelligently to guide, and efficiently to manage his patient is the outstanding influence in bringing about a favourable outcome in pulmonary tuberculosis.—*The Prognosis in Tuberculosis with Especial Reference to the Psychological Aspects, E. W. Hayes, Ann. Int. Med., March, 1931, iv, 1183.—(R. D.)*

Marriage Problems of Tuberculous Women.—The author discusses the question of marriage for tuberculous patients. In the case of progressive, febrile, open tuberculosis it is considered inadvisable, while in cases with no evidence of activity, showing a few scattered and isolated shadows, it can hardly be considered wise not to permit marriage. The danger to the woman lies in the possible progression of the disease during pregnancy, as well as infection of the consort and of the children. The transmission of genital tuberculosis is practically outside the realm of probabilities. Women are three times as liable as men to contact infection. The partner is affected mostly in cases of progressive tuberculosis in the consort, and especially when poor home surroundings obtain. Exposure and predisposition are discussed in the light of poor social and hygienic surroundings, and the separation of mother and child is recommended.—*Eheberatungsfragen bei weiblichen Heilstättenkranken, E. Gabe, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 100.—(H. J. C.)*

Criteria of Cure in Pulmonary Tuberculosis.—The case histories of three persons who died of pulmonary tuberculosis are reported. The periods of time covered are nine, eleven and twenty-two years. In each case there were periods of activity of the disease followed by longer periods of apparent good health during which the disease was considered cured. The definition of "cure" of pulmonary tuberculosis officially adopted in England by the Ministry of Health is that five years shall elapse without any manifestations of active disease. A definition that suggests itself as theoretically admirable, though of doubtful practical value, is that the term "cured" should be applied to the patient who attains the normal expectation of life from the beginning of the quiescent period.—*The Criteria of Cure in Pulmonary Tuberculosis, J. A. Struthers, Lancet, September 5, 1931, ccxxi, 530.—(R. M. F.)*

Tuberculosis and Psyche.—The tuberculous process as a whole acts traumatically upon the general organism and in a threefold manner: (1) by direct insult upon the cerebral structure as part of the whole organism; (2) by an indirect reflex alteration, as the result of limitation of the activity of the whole organism; and (3) as the result of a disintegration of the consciousness of the disease. Personality changes occur, depending upon local and general insults. Tuberculosis is, so far as it acts upon the psyche, dependent upon the nature of the premorbid personality.—*Zur Frage Tuberkulose und Psyche, E. A. Schnieder, Ztschr. f. Tuberk., 1930, lvii, 252.*—(*H. J. C.*)

Psychology of Tuberculosis Patients.—The tuberculous patient must be treated as an individual and his fears and worries must be delved into and solved. Proper psychological treatment makes life more pleasant and orients the patient into maintaining his self-confidence, as shown by his desire to live and be a useful self-supporting citizen.—*Psychology and the Tuberculous, H. Banister, J. State Med., xxxix, May, 1931, 267.*—(*J. P. B.*)

Pulmonary Tuberculosis from Industrial Standpoint.—An investigation of the occupations of 877 adults with pulmonary tuberculosis in a Lancashire county area disclosed the following facts: Approximately 42 per cent of these adults were working at a remunerative occupation; 36 per cent were regarded as totally unfit for any kind of work; and 22 per cent were fit for some kind of work and were unemployed. Periodical and more complete surveys are desirable in order to provide further data for a close examination of the various possible methods of dealing with the problem of the unemployed cases of pulmonary tuberculosis.—*Pulmonary Tuberculosis from the Industrial Standpoint in a Lancashire County Area, G. Jessel, Tubercle, August, 1931, xii, 481.*—(*M. E. P.*)

Education in German Sanatoria.—The beneficial effect of occupation as a therapeutic procedure in pulmonary tuberculosis is more and more appreciated as time goes on. This holds for the student with tuberculosis, for he is especially prone to suffer mentally and physically. The number of tuberculous college students in Germany is estimated at 2 per cent. They are weeded out by compulsory physical examination, which includes fluoroscopy. In Switzerland and France there are a few sanatoria for tuberculous students where regular college courses are given. In Germany, in St. Blasius, near the University of Freiburg, lectures are given to 113 students for about a year by various members of the faculty. The fact that the students belong to different colleges of the university and attend different semesters makes a regular college course impracticable, but the lectures are well attended and have proved to be a valuable stimulant. This experiment has state and federal support.—*Ein Jahr Hochschulvortrage dur tuberkulosekranke Studenten in St. Blasien, A. Bacmeister, Deutsche med. Wchnschr., April 10, 1931, lvii, 646.*—(*H. S. W.*)

Teaching of Tuberculosis in General Clinics.—In numerous medical centres it has come to be the custom to teach tuberculosis and to care for the tuberculous in independent special departments rather than as a part of the general clinic of internal medicine. In these places the student gets a good deal of instruction in the subject. However, it is wiser for the medical clinic to have sufficient beds for modern treatment, medical and surgical, so that this disease can be taught along with internal medicine. The polyclinics of the universities should be able to bring an understanding of tuberculosis problems to the student, because in the polyclinics all stages and types of disease present themselves. Epidemiological, prophylactic and social-welfare problems may be met in a general clinic, and in such places the student has an opportunity to become familiar with them.—*Der Tuberkuloseunterricht an den Deutschen Universitäten, F. Lommel, Deutsche med. Wchnschr., April 3, 1931, lvii, 593.*—(*H. S. W.*)

Tuberculosis in Medical Students.—Examinations to discover the frequency of tuberculous infection were made of 279 premedical college students and of 452 medical students and were compared with similar examinations of boys attending high-school. Tuberculous infection as indicated by the tuberculin test increased with age, occurring in 77.8 per cent of the high-school boys, in great part between the ages of 15 and 18 years; in 85.6 per cent of the premedical college students, largely between the ages of 16 and 21 years; and in 93.6 per cent of the medical students, largely between the ages of 21 and 26 years. The frequency of recognizable calcified nodules in the lungs and lymph nodes did not differ notably in high-school boys, in premedical college students, and in medical students. Calcified nodules of the lungs or the adjacent lymph nodes without other demonstrable tuberculous lesions were found in 44 of 279 college students, or 15.8 per cent, and 79 of

452 medical students, or 17.5 per cent. In ten of 45 instances of latent apical tuberculosis in medical students and in three of 14 instances of manifest pulmonary tuberculosis in the same group, there was associated tuberculosis of the tracheobronchial lymph nodes. Tuberculous infiltrations at the apex of the lungs were somewhat more frequent in premedical college students than in high-school boys and had not increased notably in students of the first year of medicine (4.1 per cent). In medical students they increased rapidly from year to year, being 11.6 per cent in second-year students, 14 per cent in third-year students and 20.5 per cent in fourth-year students. The frequency of advanced lesions increased at the same time, 13 students in the fourth year having lesions extending from the apex below the clavicle. Tuberculous infiltration of the apex of the lungs accompanied by symptoms or physical signs, occurred once during the first two years of medicine, four times in the third year class in medicine and nine times in the fourth year class. An increasing frequency of grave infection during adolescence and early adult life is evident, but there are available no comparable data concerning the occurrence of tuberculosis in young men pursuing other occupations and presumably in good health. The high incidence of apical lesions in these medical students, increasing rapidly from the ages of 21 to 26, indicates that they were peculiarly subject to advanced tuberculous infection.—*Tuberculosis in Medical and College Students, H. W. Hetherington, F. M. McPhedran, H. R. M. Landis and E. L. Opie, Arch. Int. Med., November, 1931, xlviii, 734.*—(*W. I. W.*)

Tuberculous School Teachers.—School children of tuberculous teachers were examined clinically, roentgenologically and serologically. In the case of teachers with closed tuberculosis 25 per cent of the children were tuberculin-positive, while in that with open tuberculosis 32.4 to 93.5 per cent of the children were positive. In most cases superinfections were being dealt with, while fresh primary infiltrations were rare. The periodic examination of teachers for contagious tuberculosis is important.—*Tuberkulöse Lehrer, F. Ickert, Zeitschr. f. Tuberk., 1930, lvii, 60.*—(*H. J. C.*)

Tuberculosis at Various Ages.—Tuberculosis mortality from 1896 to 1927 was studied. The usual peaks at the early periods of life and between 20 and 24 years of age were shown from statistical material from Norway, Sweden, England and Denmark. The diminution in tuberculosis mortality at the beginning of an age-group was also discernible in the years of the second peak. Every generation has its own curve, in that the infection-grade during the first period of life appears to be an indicator of the mortality percentage for the subsequent years. A diminution during the first life's years was followed by a similar diminution between the 20th and 25th year.—*Der Verlauf der Tuberkulose durch Generationen, K. F. Andvord, Beitr. z. Klin. d. Tuberk., 1930, lxxv, 552.*—(*H. J. C.*)

Decrease in Tuberculosis Mortality in Denmark.—During the years 1880 to 1928 the urban tuberculosis mortality dropped from 30.6 to 6.3 per 10,000 inhabitants. Denmark contains 3,607 beds for tuberculosis in 70 institutions, being equivalent to 131 beds per 100 deaths per year and more than one for each thousand inhabitants. The mortality among the various sexes differs with various regions. In Copenhagen, between 1920 and 1925, the mortality was greater among men while in the country it predominated among the women. As to tuberculosis mortality at various ages, it was greater in women between 14 and 25 years, while among men the differences were not so outstanding. In this there were again individual differences, in that the male urban mortality was greater while the rural female mortality predominated. The mortality was greatest among boys between ages of 0-5 years in the city and rural districts, while between the ages of 5-14 years the mortality among the girls predominated. The urban predominance among men is accounted for by the greater hazards of infection, while this is true for women under conditions of rural housing with its unsanitary hygienic features.—*Der Rückgang der Tuberkulosesterblichkeit in Dänemark. Zur Beleuchtung der Frage über exogene Infektion im reifen Alter, K. Faber, Beitr. z. Klin. d. Tuberk., 1930, lxxiii, 377.*—(*H. J. C.*)

German Tuberculosis Statistics.—On the basis of an extensive dispensary experience covering many years, the mortality of open cases of tuberculosis proved to be 70 per cent and the infection period for open pulmonary tuberculosis, on the average, of 2½ years. The morbidity is figured by tripling the number of annual tuberculosis deaths, which for the German Republic in 1928 was 8.8 times 3, or 26.4 per 10,000 inhabitants.—*Über die Letalität, Morbidität und Infektionsdauer der offenen Lungentuberkulose, H. Braeuning, Ztschr. f. Tuberk., 1930, lix, 109.*—(*H. J. C.*)

Tuberculosis Mortality in Russia.—The war increased tuberculosis mortality only up to the year 1923, since which time it has diminished to prewar figures, a result, no doubt, of improvement in social conditions.—*Die Tuberkulosemortalität in der U. d. SRR in den Nachkriegsjahren und ihre Ursachen, I. I. Feinschmidt, Ztschr. f. Tuberk., 1930, lvii, 32.*—(*H. J. C.*)

Decline of Tuberculosis Mortality in France.—Tuberculosis mortality in France, though still relatively high, is diminishing, especially in the cities as compared with rural districts. The rate of decline appears to have been more marked during the past few years. This is attributed to dispensaries and sanatoria, as well as improved therapeutics.—*Abnahme der Tuberkulosesterblichkeit in Frankreich, L. Bernard, and I. Biraud, Ztschr. f. Tuberk., 1930, lvii, 23.*—(*H. J. C.*)

Open Tuberculosis at Various Ages.—The mortality of pulmonary tuberculosis reaches a peak between the 25th and 30th years, diminishing to the 40th year, when it again increases and reaches relatively high figures in old age. The dispensary sees about one-half as many cases of open tuberculosis which become closed as those that die. Even in the various age-periods this relation exists, so that a curve is produced which parallels the mortality curve and shows characteristic differences between men and women. The mortality among the women increases earlier and reaches a peak which is higher than among men, but later more men die of pulmonary tuberculosis. Fatal pulmonary tuberculosis and the meningitis of infants are usually the result of domiciliary infection while from the second year of life on extra domiciliary infection begins to increase markedly. Open tuberculosis of children has markedly diminished in the last few years, so that open cases under five years of age are no longer seen, and up to the 15th year of age not even one-third as many as in previous years were observed. Sanatorium treatment is important and collapse therapy in most of the cases is indispensible. The disclosure of open tuberculosis by the dispensaries leaves much to be desired, especially in old age, since it is one of the most important sources of infection.—*Was lehrt uns die Altersverteilung der offenen Lungentuberkulose und ihrer Ausgänge in Tod und Heilung? H. Grass, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 128.*—(*H. J. C.*)

Statistics of Phthisis in Old Age.—The author reports 1,220 postmortems, of which 502 cases were over 50 years of age. Of the latter there were 107 with fresh active phthisical processes. The highest peak of the tuberculosis-mortality curve synchronized with that of the general mortality, lying between the 25th and 30th year. Tuberculosis mortality diminished after the 30th year. Another peak of tuberculosis mortality occurred in early childhood, around the 5-year age-period, in which the primary affect developed into a progressive pulmonary phthisis. The curve of healing phthisical reinfections shows a slow increase from the 15th to the 20th year, with a decided increase between the 25th and 30th year, reaching an absolute high point between the 60th and 65th year. The peak of the reinfection fibrosis of active phthisis lies between the 25th and 30th year, as well as between 60 and 65 years. Among the 107 cases with active tuberculosis in individuals over 50 years of age, only 20 per cent had chronic pulmonary phthisis, the majority of the active cases being composed of lymph-node reactions (69 per cent) and visceral tuberculosis (32 per cent). The mortality curve of phthisis during the various months shows a sharp peak in midsummer, paralleling in this respect the general mortality.—*Statistische Befunde über die Phthise, unter besonderer Berücksichtigung der Altersphthise, Mora Mordmeyer, Beitr. z. Klin. d. Tuberk., 1930, lxxiii, 280.*—(*H. J. C.*).

Tuberculosis Surveys.—In Massachusetts it has been found practicable to examine school-children for tuberculous infection on a state-wide basis by the general application of Pirquet tests, and roentgenograms as a further screen for the reactors. Although the Pirquet is less sensitive than the intracutaneous test with two or more dilutions, its simplicity makes it much more acceptable when parental consents are required, and thus makes it possible to examine a larger proportion of the school population. Studies on some 4,000 children in Massachusetts schools indicate that over 90 per cent of the patients with tuberculous lesions demonstrable by roentgenography react to the Pirquet test. In certain Massachusetts cities studied, there appears to be a definite correlation between the tuberculosis death-rate, the percentage of reactors in the public schools and the proportion of pulmonary tuberculosis found among school-children. In a group of children followed from two to six years, significantly more pulmonary tuberculosis has developed among those with the childhood type of the disease than in a "suspect" group. Exposure to open pulmonary tuberculosis in the household appears to be the most important single

factor in the development of tuberculosis in children. Control methods should include the family as well as the infected individual, and the effectiveness of such methods depends directly on education of the public in the essentials of control and on the active coöperation of practicing physicians.—*The Discovery and Prevention of Tuberculosis in the Community: a Progress Report on the "Ten Year Program" in Massachusetts, A. S. Pope, J. Am. M. Ass., September 19, 1931, xcvii, 846.*—(*G. L. L.*)

Tuberculosis Program in England and Wales.—A review of the development and present status of the organization in Wales for combating tuberculosis indicates that since 1911 the British government has taken over more and more the responsibilities for treating and preventing the disease. The local authorities in Wales, that is, the 13 County and 4 County Borough Councils are responsible for obtaining sanitary and preventive measures, compulsory notification, diagnosis and treatment. Research work is coördinated through the Medical Research Council. The tuberculosis schemes of all local authorities are under the general supervision and administration of the Ministry of Health. A chair of tuberculosis has been established in the Welsh National School of Medicine. The occupant is not only a professor in the school but is the director of research. This arrangement makes for a scientific approach to the practical problems and creates a better understanding between the young medical graduates and the authorities which are engaged in public-health work.—*Tuberculosis Schemes in England and Wales, D. Davies, J. State Med., August, 1931, xxxix, 483.*—(*J. P. B.*)

BCG.—Controversy between Calmette and opponents of *BCG* vaccination still rages, Berghaus recently claiming that adherence to general hygienic measures will have the same effect on the tuberculosis and the general mortality of infants that *BCG* vaccination does. In Baden, from 1924 to 1927, the mortality from tuberculosis in children dropped from 8 to 3.5 per 10,000: and of approximately 100 dead children in 1929 only 1.9 per cent had tuberculosis. This result, Berghaus attributes to better general hygienic conditions. On the other hand, Frantz reported 119 infants exposed to tuberculosis, of which in the first year 19, and in the second year 2 died of miliary tuberculosis and meningitis, and 6 of pertussal pneumonia. Calmette figured the mortality of infants in various countries in a tuberculous environment to be between 16 and 25 per cent. In the United States (Park), 208 vaccinated children living with mothers who had open tuberculosis showed a mortality of 0.9 per cent, whereas in 35 non-vaccinated children under the same environment the mortality was 80 per cent. Similar data have been provided from several different countries, so that it is impossible to deny the favorable influence of *BCG* upon the general mortality of infants. The low general mortality may be due to the fact that the vaccinated children have more immunity against childhood diseases, especially of the intestinal tract. It is better to vaccinate them with harmless *BCG* in order to give them resistance against superinfection. Children should be revaccinated in the fifth, seventh and fifteenth years. The above is Calmette's position. Berghaus has taken exception to these statements about as follows: If one uses the wrong method of "district statistics" of Calmette, he may also show in Baden a 50 per cent reduction in the general mortality of infants who have not had any *BCG* vaccination. In Baden there are no exact data as to the tuberculosis mortality of infants living in a tuberculous environment, but numerous reports would indicate that possibly 50 per cent of the children dead of tuberculosis come from tuberculous families. The greatest numbers die after the first year of life under conditions of both intradomiciliary and extradomiciliary infection. The protective effect of artificial immunization by vaccination is as good as nothing as soon as the natural resistance lags or breaks down. As a matter of fact, there is an increase in the general mortality in children in France since the onset of mass-vaccinations in 1927.—*Die BCG Schutzimpfung und die allgemeine Säuglingssterblichkeit, A. Calmette, and Schlusswort hierzu, W. Berghaus, Deutsche med. Wchnschr., January 16, 1931, lvii, 93 & 95.*—(*H. S. W.*)

BCG.—From September, 1927, to February, 1930, 43 exposed infants were vaccinated with a strain of *BCG* which had been tested in the Robert Koch Institute. Harmful affects were never noted. Two of the infants died of nontuberculous conditions and one of tuberculous spinal caries. The author feels satisfied that the use of *BCG* is safe, but points out that his material is not sufficient to draw general conclusions.—*Praktische Erfahrungen mit dem Tuberkuloseschutzverfahren nach Calmette, I. Zadek, Ztschr. f. Tuberk., 1930, lvii, 298.*—(*H. J. C.*)

Statistics of *BCG.*—All reports at the Seventh International Congress of Tuberculosis emphasize the harmlessness of *BCG* vaccination. A question of correct statis-

tical data again came to the foreground in the discussions. Genuine proof can be obtained only if the control children live under the same conditions as the treated ones. The careful study of Park and his associates with 280 vaccinated children speaks highly in favor of the vaccination. The value of satisfactory control material cannot be overemphasized.—*Die X-Y-Methode zur Prufung neuer Therapien mit besonderer Berücksichtigung der Tuberculoseschutzimpfung (Calmette-Verfahren), F. Bernstein, Deutsche med. Wschnchr., March 6, 1931, lvii, 397.*—(*H. S. W.*)

BCG in Riga.—During 1926 and 1927, 30 infants were vaccinated in Riga and during 1928 and 1929, 115. Some of these were treated with the original culture from Paris which was identical to that sent to Lübeck. All the children tolerated the injections well and none developed signs of tuberculosis.—*Mit Calmettes Tuberkuloseimpfstoff BCG geimpfte Säuglinge in Riga, A. Kirchenstein, Ztschr. f. Tuberk., 1930, lvii, 311.*—(*H. J. C.*)

Experiments with *BCG*.—The histological picture following *BCG* infection and subsequent infection with virulent tubercle bacilli in guinea pigs indicated that *BCG* can produce tubercles in the lungs. *BCG* bacilli cannot be considered avirulent, since they reproduce in the body and cause typical tubercle changes. There is an increase of epithelioid cells and a marked influx of polymorphonuclear leucocytes, with ingrowth of connective tissue. Necrosis of the granuloma did not occur, however, but the polymorphonuclear leucocytes suffered disintegration. Giant cells are only sparsely seen. With reinfection with virulent bacilli there occurred a hyperplasia of the pulmonary lymph nodes. Typical tubercles are not formed within four weeks after superinfection and an increase of superinfecting tubercle bacilli could not be determined in the pathological tissues. There occurs, at most, a nodular inflammation, more in the nature of an interstitial pneumonia. The author believes that an antigenic action of the *BCG* bacilli to subsequent infection with virulent bacilli, within the period of experiment, 29 days, cannot be questioned.—*Pathologisch-histologische Studien in bezug auf den Calmetteschen Tuberkelbacillus (BCG), C. Schilling, Virchow's Arch., 1930, cclxxviii, 462.*—(*H. J. C.*)

Experiments with *BCG*.—Newly born guinea pigs were given peroraly 3.75 to 15 mgm. of *BCG*, and it was found that the animals developed similarly to controls and that a transient allergy occurred in 25 to 55 per cent of the animals after one to two months. Bacilli permeated the gastric mucous membrane after a number of days, and guinea pigs killed after varying periods revealed the bacilli first in the cervical and mesenteric lymph nodes and later in the bronchial lymph nodes, finally appearing in the lungs or liver. Some of the animals showed histological changes, especially in the mesenteric lymph nodes, which presented rudimentary tubercles and proliferation of the reticuloendothelium, and lungs which showed sclerotic inflammation and interstitial pneumonia, but none showed widespread tuberculosis. The animals proved no more resistant than controls to subsequent subcutaneous injection of small numbers of virulent tubercle bacilli.—*Experimentelle Untersuchungen an neugeborenen Meerschweinchen mit BCG—Schutzimpfung "per os," A. I. Togunowa and M. M. Larionowa, Ztschr. f. Tuberk., 1930, lvii, 312.*—(*H. J. C.*)

Experiments with *BCG* in Rabbits.—Rabbits, given small doses of moderately and highly virulent bovine tubercle bacilli about 280 days after healing of a first infection with 0.002 mgm. of *BCG*, displayed a rapid reacton and infiltration, with the extrusion of a sequestrum on the sixth day. In normal animals the infection remained latent for 17 days; and while the control animals had a progressive tuberculosis of the eye, resulting from the corneal infection, the immunized animals showed a healing of the defect. Whether infiltration or cavity-formation occurs is dependent upon the period of reinfection or the condition of the allergy and immunity.—*Über eine der Frühkaverne ähnliche Reaktion der experimentellen tuberkulösen Reinfektion, E. A. Schnieder, Ztschr. f. Tuberk., 1930, lviii, 33.*—(*H. J. C.*)

Experiments with *BCG* on Monkeys.—Macacus-rhesus monkeys were carefully studied to exclude tuberculosis before treatment. The method used was prolonged clinical observation, roentgenograms at intervals of two weeks, and two opthalmotuberculin tests at 8-day intervals, alternating the right and left conjunctivae. *BCG*-treated monkeys and control monkeys were exposed to contact with experimentally infected monkeys. Some of the *BCG* animals lived slightly longer than the nontreated monkeys, but a definite protective action was not noted. The tuberculous changes of the *BCG*-treated and nontreated animals could not be differentiated. No injurious effect from the peroral use of *BCG* was noted. There was a difference, how-

ever, in the animals that were kept in the open and those kept in stalls, in that the latter became more easily infected.—*Studien über Tuberkulose. VI. Versuche, beim Rhesusmakaken durch perorale Vorbehandlung mit BCG-Impfstoff den Ablauf einer nachfolgenden Spontantuberkulose zu beeinflussen, A. Nohlen, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 532.*—(*H. J. C.*)

Experiments with *BCG* on Monkeys.—The author repeated his previous studies on monkeys in view of the criticisms suggested by Calmette. The monkeys were infected perorally in the lungs and the same conclusions previously cited were again arrived at, in that vaccination proved of no value. In stall experiments the previously treated monkeys became infected more severely than the controls and than those in fresh air. There was, however, noted in some experiments a slight prolongation of life in the *BCG*-treated animals although this might be explained in other ways than as the result of the vaccination.—*Studien über Tuberkulose. VII. Versuche den Ablauf der Spontantuberkulose de Rhesusmakaken durch prophylaktische Einspritzung von BCG-Impfstoff zu Beeinflussen. II. Tl., A. Nohlen, Beitr. z. Klin. d. Tuberk., 1930, lxxv, 525.*—(*H. J. C.*)

Aftermath of *BCG* in Lübeck.—Up to July 14, 1930, 57 of the 251 children, who were vaccinated at Lübeck, had died. More boys than girls had been inoculated and the mortality among the boys was higher. The mortality among the illegitimate was greater than among the legitimate children. According to the delivery of the vaccine there were four main periods discernible. The fatalities were predominantly in the first and fourth periods. From a statistical study in which the duration of life was also taken into consideration, there must have been a difference in the virulence during the individual periods. The mild virulence during period two is also to be noted from the postmortems, in most cases death being due to other conditions besides the tuberculosis. It is concluded that a mixing of the individual cultures was less probable than that the material that was used for producing cultures still contained some of the *BCG* strain.—*Zu den Tuberkuloseschut-zimpfungen in Lübeck, L. Lange, Ztschr. f. Tuberk., 1930, lvii, 305.*—(*H. J. C.*)

Pathogenicity of *BCG*.—The opponents of Calmette and Guérin's methods with *BCG* may be divided into three groups. To the first belong those who believe that it is not entirely avirulent; unknown conditions should favor the creation of typical, slowly progressive and sometimes mortal tuberculous lesions by *BCG* in guinea pigs. The second group claim that its virulence can be made to augment gradually by animal passages in guinea pigs or rabbits or by culturing in special media. The third group have attempted to apply the general notions about microbic dissociation to *BCG*, in order to obtain virulent S colonies and avirulent R colonies. It is indeed possible to dissociate *BCG* cultures, but experiments have proved that the S-type colonies are no more virulent for guinea pigs and rabbits than the R-type colonies. However, Sasano and Medlar contest that *BCG*, when cultivated on glycerol-bile-potato as indicated by Calmette and Guérin, never causes progressive tuberculous lesions, but they claim to have succeeded in increasing its virulence and in restoring the pathogenic properties of the strain from which it has been derived, by culturing *BCG* on an appropriate medium which imitates as nearly as possible the natural conditions of the animal organism. The author repeated Sasano and Medlar's experiments. Sixty-nine guinea pigs and 33 rabbits were inoculated subcutaneously, intraperitoneally and intravenously with doses of *BCG* ten to fifteen times higher than those used by Sasano and Medlar, without showing the least sign of tuberculosis. No lesions were noticed different from those caused by the original *BCG*. Boquet failed to note the slightest modification of virulence in *BCG* cultured and subcultured on Sauton medium, although he followed exactly the technique indicated by Sasano and Medlar. Consequently he maintains that there has been no irrefutable proof of modification of the morphological and biochemical properties and even the pathogenicity of *BCG* by experimental artifices.—*The Pathogenic Properties of BCG. A Critical Review of the Experiments of K. T. Sasano and E. M. Medlar, A. Boquet, Tubercle, November, 1931, xiii, 62.*—(*M. E. P.*)

Pathogenicity of *BCG*.—*BCG* was tested after the twentieth corneal passage and proved to be not increased in virulence for guinea pigs. No case of generalized tuberculosis was produced by the organism, but individual animals showed infiltrations at the site of inoculation or lymph-node enlargement. Compared with the tenth corneal passage there resulted a more marked infiltration at the site of inoculation, more marked also than the original strain produced. Caseation was also more pronounced. From 0.25 to 10 mgm. *BCG* were inoculated subcutaneously, intracutaneously or subfascially.—*Pathogenitätsbestimmung des BCG*

nach der 20. Corneapassage, H. J. Tiedemann, Beitr. z. Klin. d. Tuberk., 1930, lxxv, 355.—(*H. J. C.*)

Clinical Tuberculosis from *BCG*.—Orella and Del Rio cultured pathogenic tubercle bacilli from tuberculous lungs of an infant which had been vaccinated with *BCG*. They believed that this recovered strain was that of *BCG*. Yet, Calmette's suggestion was that the child had probably been infected by the test or by the feeding of raw milk. As a matter of fact, the particular infant never received raw milk; it had three oral administrations of *BCG*. One year later, it had varicella, and two years after *BCG* treatment it had bronchopneumonia and died within three days. During the last few months of the child's life, it became increasingly positive to the Pirquet test, during which time there was an increasing shadow in the upper one third of the left lung as revealed by X-ray. Autopsy revealed tuberculosis of the bronchial lymph nodes and of both lungs. Three other children revealed the same findings after treatment with *BCG*. These 4 children belonged to a group of ten, of which six were not vaccinated and remained well. The examination of the attending nurse showed no evidence of open active pulmonary tuberculosis. If the 10 children were equally exposed to an infected source, all would have become tuberculous and not only the vaccinated ones which, it is believed, fell victims to the *BCG* strain.—*Tuberkulose bei einem mit BCG, geimpften Säugling, A. Ariztia, Deutsche med. Wchnschr., February 6, 1931, lvii, 229.*—(*H. S. W.*)

Permeability of Intestine for *BCG*.—Chiari, Nobel and Sole deny the permeability of the intestinal mucosa in mature guinea pigs for *BCG* and therefore believe vaccination by this method to be impractical. The author found virulent tubercle bacilli, directly introduced into the stomach as well as mixed in bread, capable of producing a typical tuberculous infection in doses of 1 mgm. The bacilli were found in the intestinal lymph nodes within 16 to 30 days after feeding and the type of disease is an outspoken chronic one. A repetition of Chiari's technique with *BCG* revealed that 10 to 20 mgm. given *per os* is absorbed by way of the intestinal mucous membrane and causes tuberculin hypersensitiveness. The specific hypersensitiveness, as an expression of bacillary invasion, begins between the 50th and 80th day. Regardless of the severity of the tuberculin reaction no macroscopic tuberculous lesions were found in the lymph nodes.—*Über die Durchlässigkeit der Darmschleimhaut des Meerschweinschens für vollvirulente Tuberkelbacillen und für die Bacillen des BCG Vaccins, A. Saenz, Zeitschr. f. Tuberk., 1930, lvi, 131.*—(*H. J. C.*)

Disinfection of Sputum with *Matanol*.—The author describes his experiences with "Matanol," a new chlorine substituted phenol and cresole combination. A 5 per cent solution added in equal amounts to 100 cc. of tuberculous sputum proved efficient in destroying tubercle bacilli within 3 hours. The tests were performed by using Petragnani's medium as well as injecting guinea pigs subcutaneously.—*Matanol, ein neues Desinfektionsmittel zur Sputumdesinfektion, T. Sütterlin, Ztschr. f. Tuberk., 1930, lviii, 351.*—(*H. J. C.*)

Tuberculous Infection.—Tuberculous infection occurs in the minority of persons during childhood (the first period of infection) and in the majority during adult life (the second period of infection). Tuberculous diseases are generally the direct result of a newly acquired infection. An infection that does not presently reveal its malignancy with symptoms of disease but merely causes allergy will seldom give rise to disease processes later; on the contrary, it protects the organism against any new exogenous infection. Pirquet's tuberculin reaction in a healthy person is therefore to be regarded as a sign of immunity. Subcutaneous vaccination with *BCG* is harmless and, as a rule, produces immunity, often associated with allergy. The immunity is equivalent to a benign tuberculous infection, but is probably not permanent. As within a certain time, perhaps from one to four years after the vaccination, it seems to be strengthened and stabilized by any later tuberculous infection, those vaccinated possibly ought to be infected with tubercle bacilli or revaccinated with *BCG* the first year or two after vaccination. In persons living in tuberculous surroundings and giving a negative Pirquet reaction, subcutaneous vaccination with *BCG* is the sovereign means of preventing tuberculosis.—*Tuberculous Infection, J. Heimbeck, Arch. Int. Med., June, 1931, xlvii, 901.*—(*W. I. W.*)

Transmission of Tuberculosis.—Some recent articles concerning the markedly increased number of positive tuberculin reactions found in student-nurses during their training and the high incidence of clinical tuberculosis found among students and recent graduates of schools of nursing have attracted widespread attention. Facts available point to the necessity of marked changes

in the care of tuberculosis patients in all hospitals, including the special hospitals for the tuberculous. These changes are necessary primarily for the protection of those employed in the institutions and those in training for the nursing and medical professions. The incidence of positive reactors to tuberculin is reaching a very low level in some parts of the country. Slater recently reported an incidence of approximately 9 per cent in a rural community. McCain has found an incidence of approximately 4 per cent in a mountainous part of his state. Good evidence is accruing to show that the incidence is definitely decreasing. In Framingham, Massachusetts, the scene of the famous Framingham demonstration, observations were made ten years later and it was found that the number of positive reactors for children in the same age period as those examined ten years previously was approximately 25 per cent less. The tuberculosis scene has been moved so far back on the stage of life that first-infection tuberculosis now makes its appearance in adult life, whereas it was formerly believed that it practically always appeared in infancy and early childhood. Perhaps no better place to make observations exists than in schools of nursing and medicine. Here it is possible to start with the freshman class or with the probationers in a school of nursing and, by the use of the tuberculin tests, determine with a high degree of certainty which students have not yet developed the first infection type of tuberculosis. By subsequent tests on these negative reactors, one can determine quite accurately when allergy appears. In schools of medicine and nursing, the negative reactors become positive in such large numbers after exposure that one must keep constantly on the alert. By careful examination, it is possible to determine, in a certain percentage of those who become positive, where the focus is before it has become extensive. Enough evidence is now available to prove conclusively that the incidence of positive tuberculin reactors increases alarmingly in schools of nursing and medicine. The author has had brought to his attention many cases of students of nursing and medicine who gave only negative tuberculin reactions until they were compelled, with inadequate protection, to care for tuberculous patients. Following this, their tuberculin tests became positive, and some of these students now have demonstrable lesions. Tuberculosis among students of nursing and medicine now appears to be one of the greatest problems in the whole field of medicine. Studies should be initiated in all schools of medicine and nursing at once, with a view to stopping the onslaught of the disease among the young members of these professions. It becomes necessary to clear the air of the different interpretations placed on the positive tuberculin reaction and the first infection type of tuberculosis. Knowledge regarding the development of the first-infection type of tuberculosis is so new that it will take some time for its dissemination and acceptance. The tuberculin test is a test for allergy, which appears only in the bodies of persons who have foci of tubercle bacilli. These foci have resulted in areas of disease of the tissues, which may be microscopic in proportion, or it may be possible to demonstrate them by present methods of examination, particularly by the X-rays. There are those who argue from the standpoint of tuberculization, that the veterinarians are jeopardizing the future of the human race by their successful eradication of tuberculosis among cattle. If these arguments were logical, the best procedure would be to inoculate the bovine type of tubercle bacilli into the bodies of all children and thus tuberculize the race. Too much destruction among children is known to have occurred from the bovine type of tubercle bacilli to recommend any such procedure. From recent studies it appears that the attenuated *BCG* may definitely regain its virulence. Moreover, recent studies have led to the belief that allergy is dangerous. Further infection (exogenous or endogenous) results in necrosis and leads to symptoms. This apparently accounts for the fulminating type of tuberculosis, which is seen rather frequently in infancy. After the primary infection has occurred and allergy is at its height, if fairly heavy doses of tubercle bacilli are taken into the body or spread from a focus already present and lodge in tissues that are extremely sensitive or allergic, the immediate result is marked inflammation. If it is in the lung, areas of pneumonia appear around the foci. The inflammation may be so marked and extensive and necrosis occur so rapidly that the patient may die in a short time. With these dangers from the bovine bacillus it would seem impossible that there could be any recommendations of exposure to living virulent tubercle bacilli as they come from the human body. Yet students of medicine and nursing are being left with the impression that it is a good thing to come in contact with patients suffering from tuberculosis and receive just the right dose to give them a positive tuberculin reaction. Under such conditions the dosage is entirely uncontrolled. Where careful observations have been made in this country, it has been shown that approximately 30 per cent of the probationers in

schools of nursing react positively to the tuberculin test but, after they have taken tuberculosis services, from 80 to 100 per cent have been found to react positively. Since a positive reaction indicates an allergic state and since there is reason to believe that the destructive phase of tuberculosis is brought about by the allergic reaction, it would seem obvious that nothing but harm has been done by allowing students to take unmeasured doses of tubercle bacilli into their bodies and develop a state of allergy. The best evidence is that from 5 to 12 per cent of student nurses have presented themselves with tuberculous disease that required treatment soon after allergy was manifested by a positive tuberculin reaction.—*Recent Facts on Transmission of Tuberculosis, J. A. Myers, J. Am. M. Ass., August 1, 1931, xcvii, 316.*—(*G. L. L.*)

Contact Infection in Tuberculosis.—A study of 833 contacts in 185 households of fatal sputum-positive cases of tuberculosis has been analyzed in an attempt to estimate the part played by various factors in the aetiology of the secondary tuberculosis which ensued. *Sex of the Contact: 1:* In children under 5 years of age the death-rate appears to be higher among males, but the number of cases involved is too small to warrant any conclusion. *2:* The incidence-rate is greater among females in the age group 5—45 years, and greater among males in the group over 45. *3:* The death-rate is greater among females up to 25 years, and among males over this age. *4:* Among contacts over 5 years of age the incidence-rate is greater for females in the ratio 100:70; the death-rate in the ratio 100:84. These figures are probably to be explained by the fluctuations in the power of resistance in the female during menstruation and pregnancy, the evidence pointing to a depression of the allergic state at these periods. *Sex of the Primary Case: 1:* Among contacts up to the age of 15 years, the incidence is greater when the source of infection is a female than if a male. *2:* Male and female primary cases are equally dangerous to contacts between 15 and 35. *3:* For contacts above 35 male primary cases are possibly slightly more dangerous. *Age of the Primary Case:* Sputum-positive cases under 35 cause more secondary tuberculosis in the aggregate and in terms of incidence than do older cases, but it is to be noted that for contacts over 35 the incidence is higher when the primary case is over 35. *"Contact History" of the Primary Case:* When the primary case was due to contact in the home, the contacts of this case show a significantly greater incidence, and the death-rate among these contacts is higher. These facts are probably due to the factor of hereditary predisposition. *Size of the Household:* Except for the age group 5–15 the incidence-rate is higher in households containing more than 6 persons. It is felt that children of this age-group in a large household possibly have less intimate contact with the sick parent, whereas in the smaller home more attention is paid to them. *Bed-Sharing:* Under 5 years of age bed-sharing results in a very high tuberculosis death rate. The group 5–15 years was too small to warrant any conclusion. Between 15 and 35 the incidence-rate is almost doubled by bed-sharing. Over 35 there is little effect on the incidence rate. *Conjugal Tuberculosis:* Among 110 married partnerships in which one partner either died of tuberculosis or had a positive sputum, there occurred 11 cases of tuberculosis, an incidence rate of 10 per cent. In 42 instances in which the wife was the primary case 3 consorts developed tuberculosis, while in 68 instances where the husband was the primary case 8 consorts developed tuberculosis, giving a rate of 50 per cent higher for the wives than for the husbands. *Comment:* In connection with this study it is well to bear in mind the possibility that some individuals may be resistant to tuberculosis because their mucous membranes are less "permeable," while others may be resistant because the infection, having gained access to the tissues, cannot maintain a foothold against the tissue reactions.—*A Study of Contact Infection in Tuberculosis, H. M. Turner, Lancet, September 19, 1931, ccxxi, 650.*—(*R. D.*)

Child in Tuberculous Household.—Tuberculous infection is very common among children. The incidence varies widely in different localities. It is much higher, the infection occurs earlier in life, and the mortality is higher among contact children. Infection is more dangerous to infants, and the danger increases if there is continuous exposure. Childhood infection exerts a protective action as regards adult tuberculosis. Infantile infection exerts no recognized influence on the incidence of adult tuberculosis. Contact children do not constitute a public danger as spreaders of infection. The safety of children depends on the improvement in personal, domiciliary, and community hygiene.—*The Problem of the Child in the Tuberculous Household, R. C. Wingfield, Brit. M. J., October 31, 1931, no. 3695, 787.*—(*M. E. P.*)

Transplacental Tuberculous Infection.—Much's granules are considered identical with a filterable virus of tuberculo-

sis. They cannot be seen in culture filtrates because they exist as nonvisible precursors, which first develop into granules in the animal body. The offspring of 10 female guinea pigs, injected with 2 mgm. of low-virulent tubercle bacilli, and 10 with 5 cc. of a culture filtrate were examined. The foetuses and young showed various forms of tuberculosis. The authors conclude that transplacental infection leads to progressive tuberculosis and that the absence of severe anatomical changes after injections of Much's granules indicates that the tuberculous virus does not possess the pathogenic properties of tubercle bacilli themselves but rather leads to a development of immunity in the sense of Calmette.—*Über die transplazentare Tuberkuloseinfektion, M. P. Isabolinski and W. J. Gitowitsch, Centralbl. f. Bakt., I, Orig., 1930, cxvi, 491.*—(*H. J. C.*)

Bovine Tubercle Bacilli in Human Tuberculosis.—Seventeen hundred cases of tuberculosis of various parts of the body, but particularly of the bones and joints in children, collected from the literature, reveal an incidence of 1.8 per cent of bovine origin. In one-half of the cases in which bovine bacilli were found in pulmonary lesions, a connection was thought to exist between pulmonary lesions and an old bovine infection in the digestive tract. In 6 cases, one occurred in a veterinarian and four in cowhands.—*Perlsuchtbazillen als Erreger menschlicher Tuberkulose, B. Lange, Deutsche med. Wchnschr., May 29, 1931, lvii, 921.*—(*H. S. W.*)

Influence of Atmospheric Moisture on Experimental Tuberculosis.—Microscopic and macroscopic examinations revealed the course of infection as independent of atmospheric conditions. There appeared to be less severe and less widespread disease in guinea pigs in a dry atmosphere compared with those in a moist one, but this difference was not decisive and could not be excluded as due to individual variations. It is concluded that atmospheric moisture plays no influence upon the development or course of experimental tuberculosis in the guinea pig, and recommended that the behavior infection in the more chronic, human type of tuberculosis be investigated.—*Über den Einfluss der Feuchtigkeit der Atmosphäre auf die Entwicklung der experimentellen Tuberkulose, A. Mayer, Virchow's Arch., 1930, cclxxvii, 522.*—(*H. J. C.*)

Influenza and Pulmonary Tuberculosis.—Influenza and pulmonary tuberculosis reveal themselves frequently with the same symptomatology, including expectoration, night-sweats and physical pulmonary findings. The grippe-like onset and step-like course of many cases of pulmonary tuberculosis emphasize the similarity of the symptoms. As the result of four years' experience the author found, among 635 pulmonary conditions, 96, or 15.1 per cent, that consulted the physician for influenza,—42 immediately, while 54 sought advice only after months or years. The author discusses the various views regarding the relation of influenza to pulmonary tuberculosis and the disposition of the consumptive to influenza. The influence of the various influenza epidemics was variable. During the epidemic of 1889–1890 tuberculosis frequently followed influenza, while during the epidemic in Sweden between 1914 and 1915, and 1918 and 1919 there was a definitely increased mortality from pulmonary tuberculosis. The author points out the importance in discerning the influenza-like onset of many cases of pulmonary tuberculosis, and also in observing the early development of influenza in predisposed individuals, and differentiating them from patients with pulmonary tuberculosis.—*Ein Beitrag zu der Frage Grippe und Lungentuberkulose, R. Bihler, Ztschr. f. Tuberk., 1931, lix, 334.*—(*H. J. C.*)

Trauma and Tuberculosis of Bone.—The relation of trauma and tuberculosis of the bones has an extensive literature, with figures varying from 0.7 to 47 per cent. The authors studied a material of 300 cases, varying in age from 2 to 66 years. The cases in which tuberculosis of the bones can develop are given in three groups: (1) a previous focus becomes manifest due to trauma; (2) trauma leads to tissue injury, causing a *locus minoris resistentiae*, in which a haematogenous metastasis occurs (trauma is considered superfluous for the development of a tuberculosis of bone); (3) an open wound is infected with tuberculosis. These cases are believed to be only hearsay. The majority of the cases of tuberculosis of the bone are in no wise related to previous trauma.—*Besteht ein Zusammenhang zwischen Trauma und Knochentuberkulose? K. Schuberth and Vilma Mayr-Weber, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 668.*—(*H. J. C.*)

Reactivation of Tuberculosis by Trauma and Vaccination.—A young man, with negative personal and family history, was struck across the front of the left half of the chest by an iron bar. He suffered severe pain in the region of the second and third interspaces and fainted. The pain continued for three years. At the time of

the accident no X-ray studies were made, but fracture was ruled out on physical examination. Although the pain never left him completely, the patient returned to work. A short time later he was inducted for military service and received antityphoid vaccination in the previously injured area. He then developed fever, the pain became more intense, the tissues of the left pectoral region became reddened and oedematous. After hospitalization for one month, he returned to his home. His condition became gradually worse. Roentgenographic studies were made of his chest, and a sharply defined cavity was found in the left lung, extending from the second to the third interspace, with thickening of the peribronchial lymph-vessels toward the hilum and enlargement of the corresponding hilar lymph node. The remainder of the lung was clear. The sputum was positive for tubercle bacilli. It is quite likely that the trauma to the chest caused a slight infiltration in the parenchyma of the lung, by reactivation of an old hilum lesion. The process remained dormant and its reactivity was precipitated by the vaccination.—*Infiltrate precoce cavernoso obsoleto da contusione toracica locale diretta. Concausa da vaccinazione antitifica, Campani and Del Rio, Tubercolosi, November, 1931, xxiii, no. 11, 397.*—(*U. E. Z.*)

Coal-Miners and Tuberculosis.—Coal-mining involves a definite risk of anthracosis and silicosis. Both may be quite marked. In spite of the fact that silicosis is known to predispose to tuberculosis, it has long been known that the incidence of tuberculosis deaths among coal-miners is below that for all employed and retired males. Therefore it is believed that a moderate degree of anthracosis offers some protection. The hypothesis advanced is that the carbonaceous material adsorbs and inactivates the tubercle poisons. While the collier is fortunate in having a relatively low death-rate from tuberculosis, his death-rate from "bronchitis" is very high. The pneumonoconiosis causes fibrosis and devascularization and may cause colliquative changes and even cavity-formation.—*Coal Miners and Tuberculosis, S. L. Cummins, J. State Med., September, 1931, xxxix, 526.*—(*J. P. B.*)

Origin of Infiltrative Forms of Pulmonary Tuberculosis.—The possibility of haematogenous origin of the early infiltrate and the presence of old calcified reinfection beside the former in various regions of the lung, among them also in the supraclavicular region, are not to be doubted any more. The discussion now concerns itself with the relation of such petrification to the early infiltration. On the basis of a histological analysis of the sputum the author tries to study the origin of these open forms from the older calcified forms. A report of 10 cases studied roentgenologically and in the laboratory to determine the origin of the infraclavicular infiltration led to the following result: *1:* An infraclavicular infiltration can occur as the result of a massive bronchogenic metastasis of an exacerbating apical reinfection to a subapical bronchus. *2:* There is no basis for the conclusion that a liquefaction process is more frequent in an early infiltration which has no relation to an older reinfection. The flaring up of a petrified reinfection does not rarely lead to disintegration with cavity-formation. *3:* The possibility of the infiltration from a primary complex in the adult cannot be excluded.—*Zur Frage über die Genese der infiltrativen Formen der Lungentuberkulose, B. M. Chmelnitzky, Ztschr. f. Tuberk., 1930, lvi, 425.*—(*H. J. C.*)

Mortality of Infants in Tuberculous Surroundings.—Wide differences in individual statistics for the first year of life among children from tuberculous surroundings exist. In the evaluation of such statistics, the period of exposure, the severity of the tuberculous contact, the sputum content of bacilli and other factors must be considered. Living conditions and hygienic conditions appear to be less significant. The author reports an official inquiry into 119 infants who had been associated with open cases of phthisis for longer or shorter periods. Of these, 27 died within the first year (22.7 per cent) and, of these, 20 died definitely tuberculous (16.9 per cent). These figures are higher than those previously reported. The period of exposure proved of great significance: of 55 exposed for some time 29 per cent died of tuberculosis, and of 55 exposed only for short periods 5.5 per cent died of definite tuberculosis. There was noticed no difference dependent upon the mode of nourishment (breast-fed compared with bottle-fed children), in so far as the mortality or the disease form was concerned.—*Über Säuglingsmortalitat im tuberkulösen Milieu, E. Frantz, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 394.*—(*H. J. C.*)

Healing of Acute Generalized Miliary Tuberculosis in Infant.—The high mortality among infants with tuberculosis and the unfavorable prognosis are pointed out. An interesting case is reported, with the possibility of tuberculous infection existing in the first month of life in a child, that had by the end of the third month indications of bronchial lymph-node tuberculosis and

at the eighth month acute generalized miliary tuberculosis. Clinically as well as roentgenologically this case resulted in healing, and the roentgenogram showed numerous small calcified foci. The period of observation covered four years.—*Über Heilbarkeit der akuten allgemeinen Miliartuberkulose im Säuglingsalter, M. Zarfl, Beitr. z. Klin. d. Tuberk., 1930, lxxvi, 68.—(H. J. C.)*

Hereditary Tuberculosis.—Hereditary tuberculosis develops either from an infection occurring by way of the blood-stream or by aspiration of amniotic fluid containing bacilli. Haematogenous infection most probably deposits in the liver, and there then result tuberculous changes in the liver and the tributary lymph nodes. Tubercle bacilli can, however, pass through the liver without being deposited there, and be disseminated throughout the body, causing a generalized miliary tuberculosis. In infection from the amniotic fluid the tubercle bacilli enter the digestive tract, the respiratory passages or the eustachian tubes into the middle ear. The period and grade of infection are significant in the intrauterinely infected child. Early and massive infection results in intrauterine death or early death after birth. Even in the later periods of intrauterine infection the child dies shortly after birth. Up to the present there are 40 cases of hereditary tuberculosis reported. Tuberculin hypersensitiveness is important to the child. A positive cutaneous reaction before the end of the fourth week indicates an intrauterine infection. Significant are the clinical findings indicating abdominal disease, such as enlargement of the liver and spleen, abdominal venous congestion or symptoms of the respiratory organs. When the oldest tuberculous changes occur in the abdominal organs intrauterine infection can hardly be doubted. In a child, dying on the 39th day after birth, the cutaneous reaction was positive on the 16th day and at autopsy a primary-complex was found in the liver. The miliary tubercles in the lung were of a caseous pneumonic type. The mother of the child had a chronic tuberculosis which improved after several months in a sanatorium.—*Zur Klinik und Anatomie der angeborenen Tuberkulose, M. Zarfl, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 380.—(H. J. C.)*

Leucocytes in Tuberculosis of Infancy and Childhood.—The blood-picture of a tuberculous infant or child may be correlated with activity of the pathological lesion in the tissues and organs. The complete picture of activity in tuberculosis of infancy and childhood as manifested by the peripheral blood comprises the following: An increased white-cell count, an elevation of polymorphonuclear neutrophiles and monocytes, a drop in the number of eosinophiles and lymphocytes and a rising monocytic to lymphocytic ratio. Stimulated monocytes, and less often epithelioid cells, are usually observed in the supravital film only in the most acute cases. A reversion to a more normal blood-picture is found in the stages of resistance and healing. The trend of the disease may be ascertained from a numerical comparison of the different white cells determined periodically, with emphasis on the monocyte to lymphocyte ratio. Such an examination often furnishes the earliest indication of a change in the status of the disease in the young tuberculous patient.—*The Leukocytic Reaction in Tuberculosis of Infancy and Childhood, C. H. Smith, Am. J. Med. Sc., August, 1931, clxxii, 221.—(W. I. W.)*

Incidence of Tuberculous Infection in Children.—In an analysis of 1,220 children under fifteen years of age relative to the incidence of tuberculous infection and its relation to contagion, it was concluded that the incidence of tuberculous infection increases gradually from infancy to puberty and is slightly higher in girls than in boys. The incidence is doubled when there is contact with open tuberculosis, and is slightly higher in children of tuberculous fathers with positive sputum than in children of tuberculous mothers with positive sputum. The analysis suggests that the incidence of tuberculous infection in contact children in "bad" homes is higher than in contact children in "good" homes. It was concluded that the Mantoux test is more delicate than the Pirquet test.—*The Incidence of Tuberculous Infection and its Relation to Contagion in Children under Fifteen, D. J. Dow and W. E. Lloyd, Brit. M. J., August 1, 1931, no. 3682, 183.—(M. E. P.)*

Pulmonary Tuberculosis in Childhood.—Physical or X-ray examinations, in common with other diagnostic aids such as clinical history, laboratory analysis, and skin tests are rarely sufficent, but all have value (variable in importance in different cases) in helping to establish a diagnosis. McPhedran's outline relative to types of lesions occurring in pulmonary tuberculosis in children is helpful. The roentgenological description of these types is given. Both the parenchymal and lymph-node types of tuberculous consolidation resemble lobar pneumonia in X-ray appearance, and diffuse childhood-type tuberculous infiltration

resembles bronchopneumonia. The most important question whenever pulmonary lesions are discovered is: Are they tuberculous or nontuberculous? In making a differential diagnosis, the clinical history frequently takes a major part by stressing the following points: How long has the patient been sick? How sick is he? If he has fever, what is the type of the fever? Has he been in intimate contact with an adult person ill with tuberculosis? Is the intracutaneous test positive? In nontuberculous pneumonia the onset is abrupt, the patient is acutely ill, and the duration of the illness is short. In tuberculous pneumonia the onset is usually gradual; with certain exceptions, the patient is not acutely ill, the illness persists over a considerable length of time, and the X-ray lesions are persistent. In nontuberculous pneumonia the temperature is high and constant. In tuberculous pneumonia the temperature is slightly elevated and intermittent in type. A history of exposure to infection is valuable. Authorities are agreed that a positive tuberculin test is, in the early years of life, suggestive or conclusive of the existence of tuberculosis. Because pulmonary tuberculosis is insidious and treacherous, X-ray examination of the chest even in the face of slight symptoms is of the utmost importance.—*Pulmonary Tuberculosis in Infants and Children, C. E. Koenig, Radiology, July, 1931, xvii, 142.*—(*H. S. W.*)

Roentgenology of Childhood Tuberculosis.—The term "Childhood type tuberculosis" was defined by the American Sanatorium Association in May, 1929, to describe the diffuse or focal lesions in the lungs and adjacent tracheobronchial lymph nodes, that result from a first infection of the pulmonary tissue with the tubercle bacillus. The diagnosis rests on the complex picture produced by a consideration of a history of exposure, symptoms, physical signs, laboratory tests, and roentgenological examination. The symptoms are indefinite and vary in the individual case. The physical signs offer little in the way of definitely conclusive evidence. A positive tuberculin reaction indicates a hypersensitiveness to the protein constituents of the tubercle bacillus. In infants suspected of tuberculosis, washing of the stomach and examination of the contents for tubercle bacillus is sometimes efficacious in making the diagnosis. No particular type of roentgenological shadow can be predicted as definitely pathognomonic of tuberculosis. A greatly increased shadow may be due to nontuberculous inflammatory change and have no reference to the small, tuberculous, calcified nodule. Triangular areas of density, with the base resting on the mediastinal shadow and the apex reaching into the pulmonary field, are not infrequent. Transverse increase in the mediastinal shadow is particularly evident if the paratracheal lymph nodes are involved.—*Roentgenologic Aspects of Childhood Tuberculosis, B. Goldberg, Am. J. Roetgenol. & Rad. Ther., September, 1931, xxvi, 397.*—(*W. I. W.*)

Artificial Pneumothorax in Childhood and Puberty.—The author reports a series of 54 patients in a sanatorium for children which were treated during the period of 1916–1927. The majority of deaths occurred within 2 to 4 years, and if the patient survived the 4 years the outlook was favorable. The prognosis was more favorable up to the twelfth year than with the occurrence of puberty and later. The prognosis for boys and girls was equal. Since the majority of pneumothorax cases were left-sided, no decision as to the comparison of the two sides could be made. The most favorable forms were isolated upper-lobe infiltrations and cavities. With every bronchogenic dissemination the prognosis became decidedly worse. An early institution of collapse therapy is essential.—*Vermag der künstliche Pneumothorax die Prognose der offenen Lungentuberkulose des Schul- und Pubertätsalters zu verbessern? (Ergebnis der in den Jahren 1916–1927 in der Kinderheilstätte Scheidegg behandelten Pneumothoraxfälle.) H. H. Knüsli, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 591.*—(*H. J. C.*)

Tuberculous Otitis in Childhood.—Tuberculous otitis media is always a secondary lesion. The middle ear is usually infected from focí in the deep cervical or in the hilar lymph nodes. From there the infection occurs almost exclusively by the blood-stream. Contact infections from the nasopharyngeal space are extremely rare. Of all cases of otitis media in childhood it has been estimated that anywhere from 3 to 25 per cent are of tuberculous origin. The first tissue involved in the process is usually the mucous membrane of the middle ear, and in some cases the bone-marrow. Usually productive and destructive processes occur simultaneously. The ear-drum shows frequently multiple perforations. The process extends frequently to the eustachian tube; it may break into the canal of the internal carotic artery or into the canal of the facial nerve. The inner ear may become involved by extension and may become completely destroyed. It is emphasized that tuberculous otitis must always be considered as a complication of tubercu-

losis somewhere else in the body. But it may be the first clinically demonstrable lesion. From a diagnostic point of view it is important that only about one-third of the cases show a characteristic picture. Multiple perforations of the drum may be caused either by tuberculosis or by trauma. It is characteristic that these perforations occur without pain. Granulation tissue is formed not only by tuberculosis but by other chronic purulent infections. The complications mentioned may occur both in tuberculous and nontuberculous otitis. In order to establish the diagnosis biopsy is important. Tubercle bacilli may be found in the secretion. Tuberculous mastoiditis is a frequent complication. Although ruptures into the cranial cavity occur they do not produce meningitis because the barrier of the dura is hardly ever broken. Meningitis occurring in cases with otitis media are practically always haematogenous infections and not infections by continuity. The treatment must be guided in the first place by considerations of other tuberculous foci and by the general condition of the patient. A conservative standpoint is urged in regard to operative procedures.—*Die tuberkulöse Otitis media des Kindes, W. Krainz, Wien. klin. Wchnschr., November 20, 1931, xliv, 1457.—(M. P.)*

Open Pulmonary Tuberculosis at School Age.—When cases of open pulmonary tuberculosis were classified according to sex and age it was found that right-side cases predominated in boys and left-sided in girls. In both sexes the productive forms, with or without cavities, exceeded other forms. In 64.4 per cent of the cases cavities were found. The early infiltrate proved the source of acute and chronic phthisis in 76 to 80 per cent of the cases. With few exceptions the disseminated haematogenous foci were apical. Family exposure could only be demonstrated in 50 per cent of the cases.—*Zur offenen Lungentuberkulose im Schulalter, K. Nüssel, Beitr. z. Klin. d. Tuberk., 1930, lxxiii, 536.—(H. J. C.)*

Ferronovin in Juvenile Tuberculosis.—The author reports favorable effects following the use of *Ferronovin* in 28 cases of juvenile tuberculosis. There resulted an increase in haemoglobin, a shift of the white blood-picture toward a beneficial lymphocytic healing phase, improvement of the appetite, and increase in weight. The preparation was tolerated well without the appearance of undesirable features.—*Darreichung von Ferronovin bei jugendlichen Tuberkulösen, H. Hennes, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 638.—(H. J. C.)*

Avian Tubercle-Bacillus Infection.—It was not until 1890 that the bacillus of tuberculosis of fowls, closely related to the mammalian type, was accepted as a separate species. Of recent years more and more interest has been shown in the pathogenicity of avian tubercle bacilli for mammals, as evidenced by the increasing number of cases reported and the campaign for the eradication of tuberculous fowls. Avian tubercle bacilli grow more rapidly on solid culture media than the other types of tubercle bacilli, and the growth is likely to be more moist and glistening. On suitable fluid media, growth occurs without the necessity of floating the inoculum on the surface and a sediment, as well as a surface pellicle, forms. Virulent avian tubercle bacilli are pathogenic for fowls and for rabbits after intravenous inoculation. Avian tubercle bacilli are acid-fast organisms, with the capacity of forming tuberculin or of sensitizing animals to a known tuberculin, preferably avian. Cultural dissociates have been obtained from avian bacilli, the smooth colonies being virulent for rabbits and chickens and the rough colonies virulent in like dosage. This feature may throw some light on the variation in pathogenicity of avian strains. Nearly all birds are susceptible to infection with avian tubercle bacilli. An interesting fact is that parrots, parrakeets and probably canaries are also susceptible to infection with mammalian bacilli. The lesions of tuberculosis in birds are most commonly in the intestines and abdominal viscera. The intestines show ulcers and encapsulated masses which project from the serous coats. The liver, spleen and abdominal lymph nodes are also studded with well-demarcated, larger or smaller granules. Histologically, acid-fast bacteria occur in very large numbers in the central vitreous or necrotic areas, surrounded by mononuclears and foreign body giant cells arranged as a shell or sheath around conglomerate tubercles. Spontaneous lesions of avian tuberculosis have been reported in mice, rats, rabbits, swine, cattle, sheep, horses, bullocks, monkeys, wallabies and rat-kangaroos. Guinea pigs and dogs are resistant. Guinea pigs, however, can be infected by injecting large doses intraperitoneally, following which they succumb to septicaemia. Swine are readily infected by feeding droppings of infected chickens. They do not, however, show generalized tuberculosis, the lesions being confined to the lymph nodes. For experimental inoculation the rabbit is the mammal most frequently used. Intravenous inoculation of large doses results in a rapid death (17–25 days). On the other hand, small doses administered intrave-

nously are well borne, and the animals may survive and develop characteristic purulent joint lesions. Mice may also be used for experimental injections. Avian tubercle-bacillus infection in man manifests itself in various forms, the most common being ulcers and abscesses of the skin and mucous membranes, renal tuberculosis, a septic form simulating typhoid fever, "sarcoid" of the skin, dyscrasia of the blood and enlargement of lymph nodes. The point stressed by most authors is the occurrence of a specific reaction to avian tuberculins in much higher dilution than that of mammalian. The disease in its first stages is accompanied by a long-continued remittent fever, with elevation of temperature in the evening. A splenic tumor is almost always present. A list and brief summary of the reported cases of avian tubercle-bacillus infection in man are given. All observers agree that, excluding the localized lesions of the skin, the mode of entry in man is by food. Infection would most likely occur through the eating of diseased fowls or of infected eggs. Since fowls are eaten cooked, and no evidence is at hand to support infection from this source, one must focus attention on the occurrence of infected eggs, which are often eaten raw or after heating insufficiently to kill all the tubercle bacilli that may be contained in them. Recent studies have shown that probably less than 1 per cent of tuberculous hens lay infected eggs. On the question of the specificity of avian tuberculin all shades of opinion may be encountered, ranging from a belief in marked specificity to the opinion that it is a question rather of the strain of bacilli used and of its method of preparation and standardization than of a specific reaction of avian or of mammalian tuberculin. Where one observer (Shalk) found that in cattle pastured with droppings from tuberculous chickens there developed a transitory sensitivity only to avian tuberculin another (Van Es) found that of the cattle into which he had injected avian tubercle bacilli about one-half reacted to mammalian tuberculin. Apparently the only way to settle this point is to isolate from various strains of tubercle bacilli or their filtrates a substance reacting specifically on the skin. It is difficult constantly to sensitize guinea pigs with avian tubercle bacilli. When they give positive reactions, the reaction to avian is somewhat stronger than to mammalian tuberculin. On the other hand, it is simple to sensitize guinea pigs with human bacilli and they react somewhat more strongly to mammalian tuberculin. The majority of patients who react to human Old Tuberculin give less reaction with avian tuberculin. In all probability there are present in tuberculin at least two substances reactive on the skin, one specific and one nonspecific, and the proportions of these in a given tuberculin decide its specificity. L'Esperance has recently suggested that Hodgkin's disease is an atypical form of tuberculosis due to the avian bacillus and has attempted to prove it by injection of material from histologically characteristic Hodgkin's disease into chickens. She reports that in this way she was able to produce in chickens a lesion like tuberculosis and found avian tubercle bacilli to be present. Her work remains to be confirmed with careful precautions to minimize the chance of encountering spontaneous tuberculosis in chickens. The avian tubercle bacillus rarely infects man and the aetiological rôle of this organism in Hodgkin's disease cannot be accepted as proved.—*Avian Tubercle Bacillus Infection, with Special Reference to Mammals and to Man, A General Review, A. Branch, Arch. Path., August, 1931, xii, 253.—(J. S. W.)*

Avian Tuberculosis in Rabbits.—There is no record of spontaneous avian tuberculosis in the rabbit. Subcutaneous inoculation of virulent avian tubercle bacilli results in the formation of an abscess at the site of inoculation, but no generalized disease develops. However, the injection of 0.5 to 1 mgm. of virulent avian tubercle bacilli intravenously results in the death of the rabbit within a month. The form of tuberculosis produced is commonly called the Yersin septicaemic type. In the present article, the response to the intravenous injection of avian tubercle bacilli of normal rabbits and of rabbits pretreated with human tubercle bacilli is compared. Twenty rabbits were used for studying avian tuberculosis in normal rabbits. They were given an intravenous injection of 0.5 to 5 mgm. of virulent avian tubercle bacilli and all died within a month. The most striking features of the gross pathological changes were the marked enlargement of the spleen and, at times, a moderate enlargement of the liver. Neither organ had gross tubercles. The lungs were but slightly involved and rarely had a discrete lesion which would suggest tubercle-formation. The bone-marrow showed no gross tubercle-formation but it was always firm and congested. None of the other organs gave any evidence of involvement on gross examination. The histopathology induced by the avian tubercle bacillus was not found to differ materially from that produced by other types of tubercle bacilli. There may be a difference in degree, but there is no specific difference. The kidneys showed very little evidence of

inflammatory reaction. Lesions in the bone-marrow were a constant finding, as evidenced by discrete collections of mononuclear leucocytes. In some of the rabbits the major portion of the marrow was composed of a diffuse infiltration of these cells. Bacilli were easily demonstrated wherever the monocytic accumulation was found. The haematopoietic tissue of the marrow was always hyperplastic. Megakaryocytes (cells from which the blood platelets are derived) were increased in number and these cells were often seen projecting into and free within the capillaries of the marrow. The reaction in the liver consisted largely of mononuclear leucocytes within the capillaries of the organ. Giant cells with all the characteristics of megakaryocytes were frequent. Tubercle bacilli were present in large numbers. The spleen also showed a marked increase of mononuclear leucocytes, and large giant cells, similar to those seen in the liver, were common. Tubercle bacilli were always abundant. The leucocytic response in these rabbits was determined by daily total and differential counts. Blood-smears were stained with Wright's stain. Early in the disease, with this stain, it was difficult to distinguish clearly between young mononuclears or monocytes and large lymphocytes. As the disease processes advanced, however, the change in the percentage of the different leucocytic types was so marked that one could get a fairly accurate idea of the pathological process. The leucocytic response in most of the animals was fairly constant in the differential percentages, but showed considerable variation in the total counts. Twenty-four hours after the injection of the tubercle bacilli a slight rise in neutrophiles occurred, either with or followed by a small rise in the mononuclear leucocytes. These initial responses receded promptly to normal. Then for the next eight to ten days there was a tendency for the neutrophiles to decrease in number and for a slight leucopoenia to develop. After this stage a rapid rise occurred in the number of mononuclear leucocytes and the increase persisted. As the mononuclear leucocytes increased, the circulating lymphocytes tended to decrease. Following the mononuclear rise the neutrophiles again showed an increase and they were generally the dominant type before the animals succumbed to the infection. Red blood cell and blood-platelet counts were not done. There were only 4 rabbits in the protected or vaccinated group. These rabbits had received a subcutaneous inoculation of 5 mgm. of human tubercle bacilli, H37, six months before the rabbits were used in the present experiment. When inoculated with the avian bacillus the rabbits were in excellent physical condition and their blood counts were normal. The vaccinated rabbits and 8 normal ones were given an intravenous inoculation of 1 mgm. of virulent avian tubercle bacilli. The nonvaccinated animals all died within twenty-four days. In the vaccinated group all but one lived for from four to five months. The exception succumbed on the seventh day, with marked enlargement of the spleen and with gross findings identical with those of the normal controls. The pathological changes in the other 3 rabbits in the group were quite uniform. Grossly they showed a striking contrast to what was seen in the nonvaccinated animals. The spleen and liver were of normal size and showed more or less minute tubercles. In the lungs of two rabbits was found an occasional focus of typical tuberculosis. There was extensive bilateral renal tuberculosis. Each of the rabbits showed multiple tuberculous joints with abscess development of considerable extent at some of the joints, notably knees, hips and elbows. Cultures from the suppurating joints and from the kidneys gave a pure growth of acid-fast bacilli of the avian type. No human-type tubercle bacilli were obtained in these cultures. Although lesions differed in gross appearance from those seen in the unvaccinated animals, they were apparently caused by the avian tubercle bacilli. Histological studies of the tissues of the three animals revealed typical tubercle-formation, with caseation and numerous giant cells. There was calcification in many of the lesions. As a rule, tubercle bacilli were found with difficulty. The spleen, liver and bone-marrow did not show many tubercles. In the marrow, megakaryocytes were not greatly increased in numbers. Many of these cells had neutrophiles within their cytoplasm. The kidneys showed large, caseating, tuberculous lesions. In some of these lesions, in which neutrophiles were abundant, bacilli were present in large numbers. Sections of tissue from around the joints revealed abscesses with caseating peripheries. Bacilli were easily found in these sections. The most striking feature of the blood count in the vaccinated animals was the gradual change of the leucocytic picture to the septic type, which remained, after it was once established, until the animal died. There is no question that there may be a difference of degree in the histopathology caused by tubercle bacilli of avian, bovine or human type, but there is no specific difference and it is impossible to state with certainty the type of tubercle bacillus that has been the infective agent. There is, however, quite a difference in the histopathology in the vaccinated and non-

vaccinated animals described above. There were more bacilli in the lesions of the vaccinated animals, and these lesions were more typical, with caseous centres, giant cells, lymphoid infiltration and fibrosis, structures not found in the nonvaccinated animals which lived only three or four weeks. Organs which were heavily involved in nonvaccinated animals were not materially affected in vaccinated animals. Organs which were very slightly involved in normal animals became, in the vaccinated, the seat of serious involvement, with some evidence of resistance, as shown by the presence of fibrosis, calcification and giant-cell formation. This resistance was insufficient to overcome the massive damage done to the tissues. The leucocytic picture in the vaccinated rabbits was very similar to that seen in progressive cases of human tuberculosis.—*Avian Tuberculosis in Normal and Vaccinated Rabbits, E. M. Medlar, Am. J. Path., September, 1931, vii, 475.—(J. S. W.)*

Haematogenous Tuberculosis.—Various clinical pictures can be produced by haematogenous seedings of tubercle bacilli. In pulmonary involvement small disseminated foci occur which become clinically more observable when they involve the pleurae. Such cases produce the picture of polyserositis which varies from massive effusions to rudimentary forms. They are represented by dry pleuritides and multiple adhesions. Prolonged observation of such patients revealed the signs which a haematogenous dissemination produces in other organs, such as induration of the spleen, hard radial arteries with low blood-pressure, micropolyadenopathy, and finally premature emaciation. When the pleural changes are less prominent the disseminated miliary tubercles produce the picture of juvenile emphysema, associated with the alterations in other organs as mentioned above. When the seeding is particularly dense in the apices symmetrical indurations are observed,—*tuberculosis fibrosa densa.* These benign forms of tuberculosis may progress to destructive forms whenever unfavorable living conditions or intercurrent diseases lower the resistance. Then the picture of *tuberculosis ulcerofibrosa* is produced which is particularly characteristic in old age. Haematogenous tuberculosis may cause clinical pictures without pulmonary signs or symptoms. There is for example the so called serosa syndrome in which diaphragmatic or mediastinal lesions produce pain radiating into the abdomen and which is frequently diagnosed as ulcer, cholecystitis or appendicitis. The rheumatoid syndrome may be produced by haematogenous tuberculosis. It may be manifested as acute polyarthritis; and by tubercle-bacillus emboli wedge-shaped necroses of cartilage may be produced, which may lead to the clinical picture of arthritis deformans. When the endocrine glands are involved the so called vegetative-endocrine syndrome may be produced. The local lesions are tubercles or miliary necroses or diffuse alterations which may result in the severe clinical picture of pluriglandular atrophy. It is more frequent, however, to find so called *formes frustes* of hyperthyroidism, certain menstrual disorders, etc.—*Welche klinischen Bilder macht die Lungentuberkulose, die auf dem Blutwege entsteht? W. Neumann, Wien. klin. Wchnschr., November 27, 1931, xliv, 1509.—(M. P.)*

Origin of Chronic Pulmonary Tuberculosis.—The older ideas of the origin of adult phthisis in the apices and of apicocaudal progression are believed to be correct. In the majority of cases early infiltrates are metastases from apical foci. Apical tuberculosis must not be underestimated. Concepts of genuine early infiltrates without apical disease, as representing exogenous superinfection are unquestionably absurd, and the onset of adult phthisis on this basis is insignificant.—*Beitrag zur Entstehung der chronischen Lungenphthise, G. Grundner, Ztschr. f. Tuberk., 1930, lvii, 369.—(H. J. C.)*

Early Forms of Pulmonary Tuberculosis.—The cases observed in a medical polyclinic in Bonn, consisting of active tuberculosis over a period of two years, were classified into four groups: (1) infiltrations without older tuberculous changes roentgenologically, 22 cases; (2) infiltrations with older roentgenological findings, 29 cases; (3) infiltrations originating from previous disease, 21 cases; and (4) disseminated foci or nodular pulmonary tuberculosis, 11 cases. The number of infiltrations, figured on the basis of total material, was 3.7 per cent and, figured on the basis of the early cases, 60.7 per cent. The author does regard the infiltration as belonging to a definite stage according to Ranke. The predominating ages were between 13 and 25 years and the lesions were twice in the frequent in females. Aside from the early infiltrative forms there were noted initial disseminated foci.—*Über Frühformen der Lungentuberkulose, T. Plieninger, Ztschr. f. Tuberk., 1930, lviii, 152.—(H. J. C.)*

Structure and Origin of Pulmonary Infiltrate.—The author reports the postmortem of a 16-year child that suddenly from perfect health developed an undiagnosed

typhus-like condition and died six weeks later of a typical meningitis. Pathologico-anatomically, the case was one of miliary tuberculosis, with a focus resembling an early infiltration in the right middle lobe. Histologically, the infiltration proved to be a fresh exudative pneumonic condition, with beginning caseous necrosis and fine subpleural tubercles in the vicinity of the infiltrate. In structure the case resembled that reported in 1927 by Assmann and in 1927 by Zadek. The apical field was free from fresh or older tuberculous changes and could not be considered the source of the infiltration. The clinical course and the entire disease-complex is viewed as an infiltration from a haematogenous reinfection genetically.—*Zur Struktur und Entstehung der Lungeninfiltrate, H. Rubinstein and T. Pozarijsky, Ztschr. f. Tuberk., 1930, lvii,* 153.—(*H. J. C.*)

Early Infiltration in Tuberculosis.—It is now a generally accepted fact that tuberculosis does not always evolve gradually from "apical catarrh," and it is equally accepted that many cases develop acutely from the so called "early infiltration." It is still unknown exactly how often phthisis originates from the early infiltration. In two of 4 cases there was a remarkable lack of symptoms and objective physical signs, but the X-ray disclosed extensive "early infiltration" with cavitation in the clavicular region and early cavitation in the infiltration. The sputum contained tubercle bacilli. Two other cases showed initial symptoms and physical signs of sufficient degree to lead to a diagnosis of pneumonia until the X-ray revealed a cavitating early infiltration. The sputum contained tubercle bacilli in both of these instances. Progressive pulmonary tuberculosis may begin suddenly, with minimal symptoms and few objective physical findings, or with acute and severe symptoms and signs which resemble pneumonia. The importance of early examination of the sputum and early X-ray film should be emphasized again. If such cases are discovered in a relatively early stage, they are very favorably influenced by pneumothorax or other collapse therapy.—*Vom "Frühinfiltrat" zur "Phthise," M. Dugge, Deutsche med. Wchnschr., February 20, 1931, lvii, 317.*—(*H. S. W.*)

Early Tuberculous Infiltrations.—Early tuberculous infiltrations are confused with acute and chronic pneumonias with limited atelectasis, lung abscesses and lung gangrene. They frequently resemble abscess and gangrene cavities, as well as sacculated bronchiectases and bulbous emphysema. Sputum examination is important from a differential diagnostic standpoint, since tuberculous infiltrations usually transiently show tubercle bacilli. Therapeutically, early infiltrations require rest and regular roentgen control is essential. During disintegration pneumothorax treatment is the method of choice, for this improves the prognosis and prevents spread.—*Zur Differentialdiagnose und Therapie der tuberkulösen Frühinfiltrate, Dorendorf, Ztschr. f. Tuberk, 1930, lviii, 1.*—(*H. J. C.*)

Course of Early Infiltrates.—A 23-year-old patient had grown up in tuberculous surroundings, and gave a history of an acute disease followed by a typical early infiltration which had disappeared after two months. A year later, influenza developed and after this there was a flaring up of the tuberculosis at the site of infiltration but in the lower lobe, resulting in cavity. The patient had lived during this time in nontuberculous surroundings. The author believes the case one of endogenous reinfection.—*Über den Verlauf eines Frühinfiltrates, J. Weicksel, Beitr. z. klin. d. Tuberk., 1930, lxxiv, 278.*—(*H. J. C.*)

Sequence of Local Infiltrations.—The author discusses the clinical differentiation of the infiltrative tuberculous forms. Redeker separated the early infiltration from the secondary type, the former being an intrapulmonary, limited, perifocal, inflammatory infiltration, occurring in new pulmonary tissue with tuberculous focus-formation of recent duration, while a secondary infiltration is a perifocal inflammatory reaction around a previous older focus. The essential point of differentiation is the age of the central focus. The author considers the secondary infiltration as a local inflammatory residue appearing as an infiltrative extension. The late infiltrate and the infiltration around an old focus are difficult to differeniate clinically. A determination of the older foci and early infiltration can be made in the roentgen picture. The author presents 10 cases in which old calcified foci may have existed in the vicinity of infiltrations. The chalky areas can be involved in liquefaction processes and be discharged in the sputum. The clinical picture is relatively favorable, but the course may be variable.—*Der lokale infiltrative Nachschub, H. Adler, Beitr. z. Klin. d. Tuberk., 1930, lxxiii, 550.*—(*H. J. C.*)

Perifocal Infiltration in Adults.—A perifocal infiltration occurred in a 20-year-old patient, with bilateral pulmonary

tuberculosis, 8 hours after an intracutaneous reaction. The infiltration occurred in the right upper and middle fields, being ushered in with increased dulness, bronchial râles and accentuated expiration. The X-ray showed a shadow of uniform density which eventually became punctuated into individual foci. The further course was favorable.—*Beitrag zur Klinik der perifokalen (epituberkulösen) Infiltrierung beim Erwachsenen, G. Schellenberg, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 143.*—(*H. J. C.*)

Histology of Pneumothorax Adhesions.—The author reports the histological study of 37 strand-like and membranous adhesions. These are classified into (1) pure connective-tissue adhesions, (2) adhesions consisting of connective tissue and lung tissue, and (3) the most frequent form, adhesions of hour-glass form. Microscopic examinations verified the thoracoscopic observations on the form and formation of the adhesions. Of the 37 adhesions examined 11 were of pure connective tissue, 20 belonged to the hour-glass type, and in 6 there was lung tissue permeating them. In a goodly two-thirds of the cases lung parenchyma was concerned in the formation of the adhesions.—*Thorakoskopie und Kaustik. III. Mitt. Beitrag zur Histologie der Pneumothoraxverwachsungen, Ilse Franz, Beitr. z. Klin. d. Tuberk., 1930, lxxvi, 1.*—(*H. J. C.*)

Healing in Pulmonary Tuberculosis.—If pulmonary tuberculosis is considered from the point of view of curability, three forms may be described: Tuberculosis of primary infection (gangliopulmonary); tuberculosis of secondary infection (recent bronchopneumonic); chronic tuberculosis (fibrocaseous). The first two forms are capable of cure by resolution. The third can only be cured by much more complicated processes, namely, fibrous transformation and natural or artificial organic modification. As the first two forms always exist before the third, it is in these early stages that the bacillus can be most easily attacked. This should be sought principally among remedies capable of facilitating the process of resolution.—*The Natural Processes of Healing in Pulmonary Tuberculosis, M. Jaquerod, Tubercle, July, 1931, xii, 433.*—(*M. E. P.*)

Spontaneous Healing of Pulmonary Cavities.—The author reports the total disappearance of 13 cavities in 10 cases of pulmonary tuberculosis. The majority of cavities that disappeared were less than 5 sq. cm. in size but even some of 10 to 15 sq. cm. also healed. The majority proved to be early cavities.—*Zur Frage der Spontanheilung von Lungenkavernen, A. J. Katzmann, Ztschr. f. Tuberk., 1930, lviii, 393.*—(*H. J. C.*)

Healing of Early Cavities.—Ten cases with early cavities, suitably handled under conservative treatment, healed within 1 to 7 months. The first essential in conservative treatment is rest, and especially bed-rest, until the disappearance of signs of activity, and, if possible, to the point of disappearance of positive sputum. Systematic examination revealed the difference in the anatomical character and disease picture with rapidly healing cavities. On the one side are cases of short duration, favorable general symptoms, thin-walled cavities, and absence of classical cavity symptoms, while on the other side are cases with widespread caseating pneumonia and cirrhotic cavities that tend toward little improvement.—*Die Heilung der Frühkaverne, W. Bronkhorst, Ztschr. f. Tuberk., 1930, lv, 392.*—(*H. J. C.*)

Calcified Lesions in Lungs.—The object of this study was to show that the marked differences in the reported figures of roentgenographically observed calcifications are due to technical factors and the failure to use proper diagnostic criteria. The criteria for the recognition of calcification in lesions of first infection were obtained from the roentgenograms of 400 pairs of excised lungs and the descriptions of these specimens when sectioned. In contrast to the excised lung figures, data were obtained from films of living patients. The only qualifications of the subjects in both groups were that they were over fourteen years of age. Tables are given which compare the location of typical demonstrable calcifications in the excised lung series and the diagnostic cases. Though the studies of excised lungs have established accurate diagnostic criteria, there exist two sources of error. These are (1) structures simulating calcium, and (2) structures obscuring calcium. With a technique of examination based upon careful study, calcification of tuberculous first infection in the thorax is demonstrable roentgenographically in only about one-fourth of the existing cases. The superimposition of structures of varying density, the factors of cardiac and intrapulmonary vascular movement, and the minute size of many of the calcium deposits are responsible for this. Blood-vessels, roentgenographed axially, produce shadows which may be confused with those of calcium.—*Thoracic Calcification, G. R. Miller, Am. J. Roentgenol. & Rad. Ther., August, 1931, xxvi, 191.*—(*W. I. W.*)

Calcified Lesions in Lungs.—The frequency, size and localization of calcified lesions in the lung were determined from the study of 2,000 roentgen films, and of these 59.5 per cent had calcified lesions predominantly in the hilar region. In only 20.9 per cent of the cases were shadows found in the pulmonary fields alone without calcification in the hilum. So far as the localization was concerned, calcified lesions were more frequent on the right than on the left, while on the right the lower field and on the left the middle field predominated. Infraclavicular calcified lesions cannot be always designated as primary foci, but are frequently secondary or reinfection metastases. The size of the calcium shadows varied from millet-seed to cherry, the average (about 50.8 per cent) being the size of a lentil. The calcium content, which was titrated in a number of cases, did not parallel the size or weight of the calcified lymph node. More calcified lesions were found in men than in women, which was, however, attributed to the fact that more films were prepared from men. Active tuberculosis of the lung was found in 22.5 per cent of the cases examined.—*Über die Häufigkeit, Grössenverhältnisse und Lokalisation röntgenologische nachweisbarer Kalkherde in den Lungen, Gertrud Lüders, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 227.*—(*H. J. C.*)

Pleural Calcification.—Contrary to usual ideas, tuberculosis can be a cause of pleural calcification. It is difficult to see these calcified areas roentgenologically, since they may be confused with other shadows. Pleural calcification requires many years for development and, therefore, it is not seen in youthful patients. The forms of *pleuritis calcinosa* may be manifold and the site is not always at a pleural adhesion. Diagnosis is possible on account of the density of the shadow, the sharply defined wall, the relation to other calcified areas with adhesions and especially the extrapulmonary localization.—*Pleuraverkalkungen, F. Oldenburg, Ztschr. f. Tuberk., 1930, lviii, 18.*—(*H. J. C.*)

Accumulation of Iron in Tuberculous Areas.—Previous studies have shown that trypan blue or ferric chloride, when injected into the circulating blood, rapidly accumulates in an area of inflammation, where the substance is fixed and fails to drain to the tributary lymph nodes. The following experiments were set up to determine whether iron injected into the blood would accumulate and be detectable in tubercles. Rabbits were given an intravenous injection of either 0.01 or 0.001 mgm. of saline suspensions of bovine tubercle bacilli. From three to five weeks later these animals were started on a course of daily intravenous injections, each of 5 cc., of a 0.25 per cent solution of ferric-chloride crystals. The number of injections varied a great deal. The results showed an accumulation of iron in tuberculous areas in the lungs. The iron accumulates in the caseous areas of tubercles and is demonstrable by the prussian-blue reaction. Quantitative determinations corroborated these results and showed that the iron content of lung tissue in tuberculous animals injected with ferric chloride exceeds that in normal animals injected with this salt, as well as that in non-injected tuberculous animals.—*The Accumulation of Iron in Tuberculous Areas, V. Menkin and M. F. Menkin, J. Exper. Med., June 1, 1931, liii, 919.*—(*F. G. P.*)

Morbid Anatomy of Diaphragm.—There are few reports on the morbid anatomy of the diaphragm aside from those concerning diaphragmatic hernia or subphrenic abscess. The disease processes which affect the diaphragm are undoubtedly attended by impairment of function, and are therefore of importance. The more common lesions include secondary neoplasms, tuberculous and acute inflammatory reactions, and certain degenerations. Primary tumors of the diaphragm are very rare, but secondary tumors are not uncommon. Among 164 pathological diaphragms, 18 showed metastatic growths, a stomach tumor being the most common primary lesion. The most frequent type of involvement was a flat nodular infiltration beneath the serous surfaces, more marked on the abdominal side. Large areas of muscle may be destroyed by the tumor cells. In 35 of the 164 specimens, lesions of tuberculosis were present. Curiously the peritoneal surface was more commonly involved than the pleural, even though the primary focus was within the chest. The lesions showed isolated miliary or conglomerate tubercles, or more often a tuberculous serositis. Adhesions to adjacent organs were commonly observed. In a considerable number of cases tubercles were present in the diaphragmatic muscle; indeed of all muscles the diaphragm is probably most often the site of tuberculous lesions. Diaphragmitis was present in 25 specimens. Not only were the serous surfaces involved, but the muscle showed definite changes. Degeneration of the muscle fibres, capillary engorgement and lymph-channel distension, and infiltration with leucocytes were present. The primary condition was lobar pneumonia in 15 instances. Among the degenerative

changes hydropic degeneration, Zenker's hyaline necrosis, fatty degeneration, and fatty infiltration were noted.—*On the Morbid Anatomy of the Diaphragm, B. Lucké, Ann. Int. Med., December, 1931, v, 750.*—(*R. D.*)

Congenital Elevation of Diaphragm.—This condition is due to faulty development of the organ, as a result of which the diaphragmatic dome on one side, usually the left, forms a sac bulging upward into the thorax and containing displaced abdominal viscera. Petit (1674–1750) first described the condition, observed at autopsy, and distinguished it from diaphragmatic hernia. Following several other studies of the condition as found at autopsy, Wildman in 1901 reported a case observed by X-ray. Hildebrand and Hess have shown that the condition can be differentiated from diaphragmatic hernia by passing a tube into the stomach and making manometric readings of the pressure changes during respiration. If the stomach is in the abdominal cavity, the pressures will rise during inspiration; if it is in the thoracic cavity the reverse effect will be noted. The condition is a congenital defect; it has been observed in a foetus and in a child who lived only 24 hours. It is to be distinguished from elevations of the diaphragm due to (1) abdominal conditions such as ascites, pregnancy, subphrenic abscess; (2) pulmonary diseases such as fibroid tuberculosis, atelectasis, neoplasm; (3) paralysis of the phrenic nerve due to disease or operation; and (4) elevation subsequent to trauma, which is probably a reflex phenomenon. The malformation is generally discovered by chance, as there are no distinctive symptoms. Physical examination reveals diminished movement of the affected side, reduction of vocal fremitus at the base, a percussion note varying with the gastric contents, and absence of breath-sounds and vocal resonance at the base. These signs are not pathognomonic and an X-ray examination is essential. Fluoroscopy usually shows motion synchronous with that on the right side, although in one of the authors' six cases it was paradoxical. The X-ray plate will show the diaphragm as high as the second or third interspace. There is usually a large stomach bubble. A barium meal will aid in excluding diaphragmatic hernia, as recumbency in this condition will cause some of the barium to pass into the pouch above the diaphragm. No curative treatment is possible, but fortunately the condition seldom causes discomfort. Six cases observed by the authors are briefly recorded. There has been no opportunity to compare the results of physical and radiological examinations with post-mortem findings.—*Congenital Elevation of the Diaphragm, W. B. Wood and F. G. Wood, Lancet, August 22, 1931, ccxxi, 392.*—(*R. D.*)

Heart and Diaphragm.—The diaphragm scarcely receives the clinical consideration which its location and functions warrant. Next to the heart it is probably the most important muscle in the body. Its main function is respiratory, but it also has a circulatory function, aiding the return flow of the venous blood by creating a negative pressure in the chest and by compressing the liver. In effusive pericarditis the diaphragm may be inflamed, with hiccough and symptoms referable to the diaphragm. Dyspnoea may be an outstanding symptom of diaphragmitis; it is a good rule, therefore, to suspect the diaphragm when the dyspnoea is out of all proportion to the findings in the chest. Altered abdominal pressure changes the position of the diaphragm, with occasional respiratory distress. One wonders if the frequency of acute coronary thrombosis, at the height of a generous banquet, is not due to embarrassed filling of already sclerosed coronaries by a distended stomach pressing the diaphragm against a diseased heart. A low diaphragm is associated with the thin narrow chest, poorly defined digestive complaints, and circulatory complaints, such as dizziness, dyspnoea, palpitation, and fatigue upon exertion. Such individuals are relieved by the use of a supporting abdominal binder.—*The Heart and the Diaphragm, I. M. Trace, Ann. Int. Med., December, 1931, v, 759.*—(*R. D.*)

Effect of Contraction of Diaphragm on Bronchi.—Dried bismuth subcarbonate was insufflated into the bronchi of the right lung of anaesthetized dogs. The right phrenic nerve was divided and the distal end stimulated by a faradic current. Lateral and dorsal X-rays were taken during stimulation of the nerve and in the phase of expiration. The changes in length and in the angle of deviation of the bronchi were measured and the actual lengths calculated from these figures. The measurements in 8 animals showed an average lengthening of the bronchi during stimulation of the phrenic nerve of 21 per cent for the upper lobe and 34 per cent for the lower lobe. If the change in bronchial length is taken as an indication of the change in respired air, contraction of the diaphragm produces a slightly greater effect on the lower than on the upper lobe. However, the difference is so slight during normal respiration that it is of no practical importance.—*The Relative*

Effect of Contraction of the Diaphragm on the Bronchi of the Upper and Lower Lobes, I. A. Bigger and B. Cox, Arch. Surg., December, 1931, xxiii, 1041.—(*R. D.*)

Respiratory Excursion of Diaphragm.—A technique for recording the amplitude of excursion of the diaphragm on a single film is demonstrated. This is attained by altering the exposure-time, voltage, or wave-length factors during inspiration. The diaphragm, with its mass of soft tissues beneath, affords quite a complete barrier to the quantity of radiation used in chest roentgenography. When a record is made of its position first on inspiration, the ascending soft tissues in expiration will preserve the first exposure. Conversely, the elevated diaphragm of expiration will protect a large area of unexposed films for radiation during inspiration. When the diaphragmatic shadows are well contrasted, the respiratory excursion of the heart may be noted and an estimate made of the change in its borders and apex position.—*A Graphic Method of Recording the Respiratory Excursion of the Diaphragm, H. Thomas, Am. J. Roentgenol. & Rad. Ther., December, 1931, xxvi, 878.*—(*W. I. W.*)

Mechanism of Inflation of Lungs.—In the literature dealing with postoperative collapse of the lung there has been no distinction between the various conditions which have been termed "collapse." Four types of deflation of the lung are described, as follows: (1) simple deflation; (2) simple deflation with secretion; (3) massive-collapse attack; and (4) massive deflation of one lung. Two normal anatomical and physiological facts which are constant influences in the production of deflation are the elasticity of the lung and the minimal use of the lung at rest. In normal individuals and postoperative cases it has been shown that on assuming the supine posture the intrathoracic volume is decreased immediately and that the decrease persists for some time. At rest the weaker stimuli conditioned by diminished respiratory requirements evoke a smaller thoracic expansion which is unequal because of unequal action of the thoracic muscles. In the normal individual assuming the supine posture with quiet breathing the diaphragm is elevated, more in the posterolateral than in the anterior portion, and the transverse and anteroposterior dimensions of the upper part of the thorax are increased, while the vertical measurement is diminished. The next result is a decrease of capacity which occurs at the expense of the lower part of the thorax, and more posteriorly than anteriorly. The two types of simple deflation are very common, and occur chiefly in the young. Those normal individuals with big respiratory capacity, a natural tendency to thoracic breathing, signs of emotional distress, loss of musclar control of the lower thoracic margins, evidence of general debility, and those who remain in such a posture that the spine is extended, tend to develop deflation of the lower lobes. It is detectable in children within half an hour. It is well developed at thirty-six hours in any adult who lies quietly, and, if the lung is inflated, deflation recurs on resuming quiescence. A completely deflated lower lobe occupies an area beneath a triangular space posteriorly delineated by the vertebral column, a horizontal line through the eighth rib in the scapular line, and an oblique upper margin extending from the fifth dorsal vertebra to the intersection of the horizontal line with the posterior axillary line. At necropsy simple deflation appears as follows: The deflated area is smaller than normal, darker in color, more solid, and the capsule is wrinkled. It tends to sink in water. Microscopically, the walls of the alveoli are approximated, the blood vessels are dilated, and fibrous tissue is distended and more obvious than usual. The fibrous tissue stretches, to follow the shrinkage due to deflation. The bronchi are patent and may or may not contain mucus and cells. There is no evidence of inflammation of the pleura or lung, or of desquamation of bronchial mucous membrane. The condition may be found in different areas and degrees. The picture may be modified by antemortem oedema or by disease. Simple deflation was found and studied before and after death in certain conditions marked, as far as the lung was concerned, by only simple lack of muscle movement. These conditions included coma, postoperative complications, spinal-cord lesions, and unilateral phrenic paralysis. In none of them was there bronchial obstruction. Further confirmation of the above described picture of simple deflation was found in the study of certain pathological conditions, such as cardiac dilation, localized peritonitis in the region of the right lobe of the liver, and diphtheria with paralysis of the diaphragm. The fundamental cause of simple deflation is the reduction of the need for a large air entry into the lungs. When pulmonary complications follow operation, deflation must be regarded as the primary condition on which further changes which occur in the lower lobes are implanted. Simple deflation is usually not detected, as no symptoms occur. Simple deflation with secretion may occur with or without bronchial and pulmonary inflammation.

Active treatment is unnecessary in simple deflation, and will do harm in cases of simple deflation with secretion. The massive pulmonary-collapse attack was originally described by Pasteur, and is rare. Usually the onset is acute, with pain, orthopnoea, cyanosis, and general distress. These symptoms commonly disappear in forty-eight hours. The three main theories concerning the genesis of this condition are discussed, as follows: *1:* Pasteur ascribed it to paralysis, probably reflex in origin, of some of the respiratory muscles. Phrenic paralysis gives rise to different signs, and in cases of so called postdiphtheritic paralysis the diaphragm can be made to contract. *2:* The theory that the condition is the direct result of bronchial obstruction is made invalid by the fact that deflation occurs without evidence of bronchial obstruction. *3:* Pulmonary emboli travelling by veins or lymphatics from a wound are suggested as aetiological factors. Deflation occurs without evidence of emboli. The attacks are explained by the author as instances of acute pleurisy occurring when the lower lobes are already in a condition of simple deflation. The reason given for this explanation is the similarity of the physical signs and the relief of pain by restriction of chest movement in both pleurisy and massive collapse. The points recommended in treatment are as follows: *1:* The most comfortable posture should be allowed. *2:* Bandages should not be too tight above the umbilicus. *3:* Movements which do not cause pain should be allowed. *4:* Sputum should be raised by a short, sharp expiration preceded by a long, slow inspiration, and postural drainage should be used. If fever is present and the sputum is purulent an inhaler supplying creosote should be worn continuously. *5:* Strapping the chest relieves the pain. *6:* When the patient is up, full respiratory activity should be reacquired before discharge. Deflation of a whole lung is not essentially a postoperative condition. It rarely occurs in civil practice. Injuries to the chest are exciting causes, and the lung deflated may be on the same or opposite side. The questions of reflex inhibition of expansion and of injury by contracoup arise. In two cases described the mechanism of production clearly was defective muscular action. This type of deflation differs from the other three types in that in it the upper part of the thorax is out of action.—*The Mechanism of Inflation of the Lungs and the Influence of Deflation on Post-Operation Complications, C. Briscoe, Lancet, September 5, 1931, ccxxi, 513.*—(*R. M. F.*)

Collateral Alveolar Respiration.—In 1930 Van Allen and Lindskog showed that there is a definite intercommunication between the alveoli of the same pulmonary lobe, probably through the alveolar pores of Kohn. No such communication exists between the lobes, for the interlobar septum is complete, while the interlobular septum is incomplete. Atelectasis was not produced by lobular obstruction, but was by lobar bronchial obstruction. Atelectasis occurs in both man and animals; hence there must be some factors which interfere with collateral respiration. The work presented in this paper was carried out to determine and evaluate these factors. Lobular bronchial obstruction was produced in a series of dogs, and about half of the animals were then treated further; some by placing fluid in obstructed parts, while others received chemical or bacterial irritants in the same region. The remaining half were used as controls, some of which developed bronchitis and pneumonia, thereby giving an opportunity to study the spontaneous changes after lobular bronchial obstruction. The chests were opened under positive-pressure breathing and the main bronchus of the right lower lobe was ligated just peripheral to the origin of its first branch. About nine-tenths of the lobe was thus occluded. *Experimental results: 1:* In 20 dogs lobular obstruction was produced without supplementary treatment. Fifteen of these showed normal aeration according to both repeated X-ray findings and findings at autopsies done twenty-four hours to three months after operation. Five animals developed distemper and at autopsy at different times during the disease showed mucopurulent exudate scattered throughout the entire bronchial tree, including the right lower lobe. Only one showed true atelectasis. *2:* In 13 dogs supplementary treatment was instituted, namely: *a:* Five had right single or bilateral phrenicectomy, which was followed by morphine to further depress respirations. In all cases no collapse developed. *b:* Four dogs had fresh autogenous blood introduced into the occluded bronchus through a bronchoscope. Daily X-rays and autopsy after three days showed that the ligated division of the lobe retained air in all cases. *c:* Two dogs were bronchoscoped and 1 cc. of ether was injected into the same region. In twenty-four hours one showed complete atelectasis of the right lower lobe and the second showed a partial atelectasis with regional haemorrhagic infiltration at autopsy done seventy-two hours after operation. *d:* Two dogs, immediately after ligation, were injected with a broth-culture of pneumococcus (type I) into the same region as those described above. At autopsy, done forty-eight hours later, both showed pneumonia and atelectasis in the

right lower lobe. These groups illustrate the fact that aeration of a whole lobe can take place through a single lobule, but that inflammation of any type may interfere with this compensatory collateral function. In four dogs a glass cannula was passed into the bronchus leading to the right lower lobe, this bronchus having previously been ligated as in the first set of experiments. It was shown, by varying the respiratory depth and rate, that the amount of circulating collateral air was directly dependent upon the respiratory movements. In conclusion it would seem that a very small area of one lobe is sufficient to maintain normal air-circulation in the whole lobe, that a wide margin of safety exists as regards the amplitude of respiratory movements, since very shallow breathing affords significant collateral exchange. Inflammation must be extensive enough to completely occlude the collateral circulation before collapse takes place. Atelectasis occurs in the presence of bronchiolar obstruction only when collateral circulation is markedly impaired or abolished.—*Postoperative Atelectasis and Collateral Respiration, C. M. Allen and T. S. Jung, J. Thorac. Surg., October, 1931, i, 3.—(J. G. K.)*

Oxygen Inhalation at High Altitudes.—At moderate altitudes signs of oxygen deficiency in healthy, nonacclimatized individuals are beneficially influenced by oxygen inhalations. There are differences between healthy and tuberculous individuals in this respect. In pulmonary tuberculosis signs of chronic oxygen deficiency persist after acclimatization. Artificial oxygen inhalation can partly or wholly cause these to disappear. There was a definite decrease in the maximum blood-pressure and a decrease of amplitude. Oxygen administration benefits the heart, shortens the acoustic reaction, and diminishes finger tremor. In tuberculosis, fatigue is decidedly increased as occurs in the case of oxygen deficiency. A slight amount of work causes a decrease of the systolic blood-pressure and its amplitude, both of which increase with artificial oxygen administration. In cases of mild disease and those with productive fibrous processes without marked toxic symptoms effects are less marked than in severe cases. It is possible, by determining the pulse and blood-pressure, the finger tremor and the reaction time following acoustic stimulation, before and after oxygen administration, to estimate to a certain extent the extent of the disease and toxic action upon the organism quantitatively.—*Über den Einfluss künstlicher Sauerstoffatmung im Hochgebirge. IV Beitrag. Das Verhalten von Puls, Blutdruck, Reaktionszeit, Tremor und Tastkreisen bei Tuberkulösen, E. Stern and J. E. Wolf, Beitr. z. Klin. d. Tuberk., 1930, lxxiii, 609.—(H. J. C.)*

Influence of Oxygen Inhalations on Metabolism.—The author tested whether oxygen inhalation as an adjunct to insulin improved the utilization of foods, with resulting weight increase. It was known that the injection of oxygen under the skin stimulated appetite and that diabetes under the influence of oxygen treatment decreased the feeling of hunger, while the weight remained the same. The tuberculosis cases were permitted to inhale oxygen by means of a respirator for 2 to 4 minutes daily in the morning. The results were favorable, in that 75.5 per cent of the 33 cases treated gave positive results. The oxygen inhalations increased assimilation nine-fold. It is believed that such inhalation stimulates the islet apparatus of the pancreas, producing a hypoglycaemia which increases the function of the islet apparatus.—*Über den Einfluss der Sauerstoffeinatmung auf die Nahrungensausnutzung bei Tuberkulosekranken in Sanatorien. Vorl. Mitt., W. Oksiusow, Ztschr. f. Tuberk., 1930, lvii, 240.—(H. J. C.)*

Histiocytes of Blood in Pulmonary Tuberculosis.—Monocytes originating from the reticuloendothelial system appear in high percentage mostly in subcompensated tuberculosis, especially that with favorable prognosis. Histiocytes, phagocytic large cells, are normally not found in the blood. The appearance of histiocytes is always viewed as an unfavorable sign. The author reports 2 cases illustrating this and indicates that in both of these a very virulent mixed infection played a rôle.—*Über die Histiocyten des peripheren Blutes bei der Lungentuberkulose, R. M. Achrem-Achremowitsch, Ztschr. f. Tuberk., 1930, lviii, 344.—(H. J. C.)*

Carbohydrate Metabolism in Tuberculosis.—The carbohydrate metabolism was studied in rabbits and guinea pigs. At the beginning of infection there occurred a definite hypoglycaemia. The functional dynamic tests (utilization of glucose and blood-sugar curve following adrenalin) indicated that the disturbances were similar to those in tuberculous individuals. The described glycogen poverty of the liver of guinea pigs and rabbits was verified. The disturbance of sugar regulation does not depend upon hyperfunction of the pancreas. In the guinea pig there was found, histologically, a tendency toward atrophy of the lobule and sclerosis of the islets of Langerhans. Liver dysfunction, combined with disturbance of

the normal fermentative processes, plays a predominant rôle in the altered sugar regulation. In extensive pulmonary tuberculosis hypofunction of the adrenals is also significant. On the basis of these experimental studies the therapeutic use of insulin is not only indicated in diabetic tuberculous individuals but also in various forms of tuberculosis.—*Kohlhydratumsatz bei experimenteller und Lungentuberkulose, I. E. Rabuchin, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 541.*—(*H. J. C.*)

Loss of Hair in Tuberculosis and Cholesterol.—Loss of hair is frequent in cases with pulmonary disease, especially in tuberculous women. Because of the change in the cholesterol mirror in tuberculosis and the significance of cholesterol for the follicle glands the author used a cholesterol preparation, *Trilysin*, in 86 cases of women with pulmonary disease. Coincidently, in control tests, massage of the head and pure alcohol was employed. These tests all proved the advantages of the use of Trilysin. The evaluation of the tests was made by daily counts of the number of hairs which were lost during treatment.—*Haarausfall bei Tuberkulose und Cholesterin, G. Zimmermann, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 663.*—(*H. J. C.*)

Acid-Base Balance and Ionized Calcium in Blood in Tuberculosis.—By exact studies on 40 tuberculous individuals with various forms of disease, it was found that the pH of the unchanged plasma, the total CO_2, as well as total calcium, ionized calcium and inorganic phosphorus representing the substances which regulate the acid-base balance of the blood, showed no variation in these cases. The mineral-diet treatment, according to Sauerbruch-Herrmannsdorfer, also produced no variation. The authors believe that in order to determine without doubt the significance of hyperalkalinity, hyperacidity, transmineralization or demineralization in tuberculosis, a much larger series must be submitted to tests.—*Säurebasengleichgewicht und ionisiertes Calcium im Blute der Tuberkulösen und ihre Veränderungen bei Mineraldiättherapie nach Sauerbruch-Hermannsdorfer-Gerson, B. Varela, P. Recarte and J. Esculies, Ztschr. f. Tuberk., 1930, lvii, 380.*—(*H. J. C.*)

Chemical Composition of Pleural Exudates.—Pleural exudates were studied coincidently with blood tests and the following conclusions obtained: Tuberculous pleural exudates closely resemble the coincident blood conditions. However, certain moments indicate, especially for cholesterol and calcium, that selective processes play a rôle; with chlorides and with uric acid a retention in the exudate must be assumed. A comparison of tuberculous pleural exudates with exudates from other source shows a parallelism in the chemistry of the exudates in tuberculosis and of those in cardiac conditions. An autolysis of protein, leading to the formation of urea and amino acids, causes a diminution in the protein present. In fresh effusions the quantity of albumin is not necessarily an index of the grade of inflammation present. Neither the absolute nor the relative content of cholesterol in effusions can be considered of differential diagnostic value. The variations in nonpurulent exudates are so slight and inconstant that they cannot serve to differentiate a tuberculous condition.—*Die chemische Zusammensetzung tuberkulöser Pleuraexsudate und anderer Ergüsse in die Brusthöhle, F. Reiche, Beitr. z. Klin. d. Tuberk., 1930, lxxiv, 652.*—(*H. J. C.*)

Acid-Fast Bacteria.—The study of the biological action of specific chemical units derived from strains of mycobacteria has brought to light a number of features which serve to clarify our knowledge of these organisms. These chemical units are of two types: those common to all members of the family, and those specific for the living chemistry of the different strains of the family. The mycobacterium family in most classifications is listed as containing some 19 species. The present methods of classifying them are very uncertain. The mycobacteria are related to the actinomyces by their occasional branching and by staining properties. They are related to the corynebacteria by their production of metachromatic granules. The studies of Kahn have shown that these granules are an important visible part in the life-history of a single bacillus. Two disease conditions are produced by the pathogenic members of the mycobacteria, namely, wasting and hypertrophy of skin cells, as typified by Jöhne's disease and by leprosy. Another characteristic is the temperature response which the body makes, not only to infection itself but after infection to the parenteral introduction of certain substances isolated from the bacilli. We now know two clean-cut chemical units taking part in the temperature reaction,—a protein and a polysaccharide. No family has a wider spread in nature than the mycobacteria. The saprophytes occur as the timothy grass branch, the dung branch and the grain and soil branches, and also on the skin and genital organs of man and animals. One can scarcely doubt that there is a certain relation between the fact that

these saprophytes are found on the skin and genitals of man and animals and on plants and in soil. All animals ingest acid-fast bacilli with their plant food and it is possible that there is a surviving residual strain at the faecal exit which, after the passage through the intestinal tract and all the varying factors met there, finds a food supply and physical conditions suitable to existence. In the soil bacterial life may meet much variations of temperature, moisture and food supply, sunlight, communal life or intermediary host as to determine the survival and overgrowth of virulent or avirulent, pathogenic or saprophytic strains, and this may be the realm of explanation of many obscure disease cycles. Schalk recently found that the avian tubercle bacillus cast upon the ground by infected chickens survives two Minnesota winters. Walker thinks that certain strains of Hansen's bacillus, during their life in the soil, pass through some modifications which bring to the front those capable of life in the monocytes of the skin of man or rat. It seems to be true that in order to produce disease a mycobacterium, after gaining entrance to the body, must gain entrance also to a monocyte. In seeking the reason for the specific relationships of these two living cells we must first examine the host cell, or monocyte. The origin of monocytes in the body has lately been presented in a new light by Forkner. He ascribes their origin chiefly to the lymph nodes but also finds them arising in the spleen, Peyer's patches, subcutaneous connective tissues, lungs and omenta in the rabbit. Their chief round of activity in the body is from their places of origin, probably generally toward the liver. In the lung they are certainly very abundant and perform some function there. Certain observations would indicate, moreover, that they are in some way connected with fat metabolism and burning. That selectivity of strains for tissues occurs is exemplified in lupus, leprosy and Jöhne's disease. Since many strains of the mycobacteria will grow on a common, simple, synthetic medium, large quantities of bacteria can be made available for comparative chemical study. When a medium of known chemical composition is used, every new organic substance appearing in the flask of growth of a given bacillary strain must have been made by the development of that strain, and so exact quantitative data can be drawn. From the time of Koch's announcement of a cure of tuberculosis interest has never died in his supposed curative agent, tuberculin. In 1907 Pirquet presented to the world the tuberculin reaction and the whole question of allergy which later became involved with the problem of immunity. Within the last few years allergy and immunity have been clearly separated by Rich, Branch and others. The substance in tuberculin responsible for the skin reaction has been greatly purified by Seibert. In fact she has probably produced it in crystalline form. A very pure commercial product, MA100, from the several type strains of acid-fast bacilli is now made by the Mulford Laboratories. A curious thing is that when this substance is pure it is apparently one of the common protein fractions for the acid-fast family. At least the difference is in the main a quantitative rather than a qualitative one. Market tuberculins differ in strength and there is no satisfactory method of standardizing this complex substance. When attempts are made, it is standardized on its guinea-pig-killing properties and then used for testing allergic skin reactions. It is known from the work of Dorset and the writer that there is probably no definite relation between these two biological reactions if we could have clean chemical units. One of the guinea-pig-killing properties of tuberculin is probably a stable polysaccharide and gives no skin reaction. The skin reaction is due probably to a water-soluble protein. The polysaccharides are nonantigenic, produce no skin reaction, are soluble in all proportions in water, and are very stable. They are excreted almost quantitatively in normal rabbit's urine and yet are severely toxic for the tuberculous guinea pig. It is possible that this type of substance is in some way responsible for some of the symptoms of those ill with tuberculosis, especially the peculiar temperature curve. One other wide difference in the chemical units of the many that exist is in the phosphatide fractions. Anderson has found that the chemical units in the phosphatide fractions of the strains studied differ in several particulars and Sabin and her co-workers, especially Doan, have described biological differences. The phosphatide fraction is antigenic and when tested against the sera of animals injected with phosphatide of different strains there is marked difference in the dilution at which precipitation occurs. This suggests again that there is a fraction common to all strains but also a specific fraction for each. The need for more exact knowledge of the diseases produced by acid-fast bacteria is obvious.—*Acid-Fast Bacteria. Their Relation to Disease and the Need for More Knowledge, W. C. White, Bull. Johns Hopkins Hosp., March, 1931, xlviii, 143.*—(*F. G. P.*)

Acid-Fast Bacteria in Oil and Water Systems.—Mudd and Mudd, using a dark-

field microscope, made the interesting observation that acid-fast bacteria pass readily into oil from water suspensions, while non-acid-fast bacteria remain in the water. A simpler though more indirect method suggested itself. It gives results apparently in complete agreement with those of Mudd and at the same time permits of certain quantitative considerations which are impossible in direct dark-field observation. The bacteria were suspended in water or Tyrode's solution in test-tubes, various amounts of olive oil were added, usually two parts of water suspension to one part of oil, and the tubes were stoppered and shaken mechanically for one hour. The emulsions were then either centrifugated or allowed to stand until the two layers separated. The concentration of the suspension of bacteria remaining in the aqueous phase was determined by comparing the opacity with that of standard suspensions of the same organism or by counting the bacteria, using Breed's procedure. The organisms used were *M. phlei, M. butyricus, M. leprae, M. smegmatis, M. marinum, M. beroliniensis* and two strains of *M. tuberculosis*, a bovine and a human strain, as representative acid-fast species, and *B. subtilis, Es. coli, Pf. mallei* and a capsulated Friedländer type as typical of non-acid-fast species. All the acid-fast species partitioned almost completely into the oil; all the non-acid-fast species remained in the water phase. Considerable difference in the completeness of partition of the different acid-fast species into the oil was observed. This difference seemed to be correlated with the degree of acid-fastness. Several other oils were substituted for olive oil with similar results. Fat solvents were similar to their action to the oils. Mudd and Mudd found that acid-fast bacteria, sensitized to homologous immune serum behaved more like non-acid-fast bacteria in oil and water systems. Extending the procedure used in the former experiments, series of dilutions of anti-*M. phlei* rabbit serum and of normal rabbit serum were arranged in tubes to which was added a similar suspension of *phlei* organisms and two parts of olive oil to one part of water suspension. The tubes were shaken for half an hour and then centrifugated for 10 minutes at low speed. The results showed that homologous immune serum inhibits, in proportion to its concentration, the partition from water to oil. The immune serum in 3 to 6 per cent concentration produced approximately the same influence on the partition of the bacilli as 20 to 100 per cent of normal serum. Later observation indicated that the immune serum used in these experiments was of a very low potency as shown by agglutination reactions. The action of an emulsifying agent was suggested by the effect produced by normal serum. Several emulsifying substances were therefore examined. Gelatine and sodium oleate also inhibited the partition from water to oil.—*The Behavior of Acid-Fast Bacteria in Oil and Water Systems, G. B. Reed and C. E. Rice, J. Bact., October, 1931, xxii, 239.*—(*F. G. P.*)

Value of Egg Media.—Media, containing egg and prepared according to Lubenau-Hohn, Petragnani (without malachite-green to exclude the inhibitory dye action) and Sweany-Evanoff, were compared. For test materials pure cultures, 105 sputa treated with sulphuric acid, and 5 urines were included in the material. The Sweany-Evanoff medium proved superior to the other two, especially with contaminated material treated with sulphuric acid. Growth occurred less frequently, began at a later period, and the colonies were sparser and fewer with the bovine bacillus than they were with the human. The preparation of the Sweany-Evanoff medium is more complicated than the other two. The Lubenau-Hohn medium was found superior to that of Petragnani. A poor growth on the Sweany-Evanoff medium is probably due to the fat content, the fat accumulating on the surface of the medium and inhibiting growth. Aside from this the surface layer of fat makes it difficult to discern the colonies.—*Vergleichende Untersuchungen über den Wert der Eier-Nahrböden, Dscheng Li Bang, Beitr. z. Klin. d. Tuberk., 1930, lxxv, 367.*—(*H. J. C.*)

Bactericidal Action of Iodipin.—Iodipin, in 20 per cent concentration *in vitro*, was unable to destroy tubercle bacilli within 148 hours. "Mohnöl" (poppy-seed oil) destroyed them much more rapidly. The author attributes the action of iodipin to the vehicle, poppy-seed oil, and states that the iodine in iodipin has no bactericidal effect. Pus and intestinal bacteria are destroyed only after hours treatment with 20 per cent iodipin. In practice it is not safe to depend upon a self-sterilization of iodipin.—*Über die bactericide Wirkung des Jopidins gegenüber Tuberkelbacillen und anderen Bakterien, T. H. Amako, Ztschr. f. Tuberk., 1930, lviii, 178.*—(*H. J. C.*)

Cultivation and Differentiation of Tubercle Bacilli.—The authors endeavored to work out a method for cultivating bovine as well as human tubercle bacilli. The determination of human bacilli in the sputum was attained by treatment with 15 per cent

hydrochloric acid and inoculation on Petragnani medium. With this method 255 microscopically negative sputa yielded 12 positive cultures (4.7 per cent). The tests were run parallel with Besredka's bouillon as a medium, which was found suitable with microscopically positive sputa, especially in obtaining a rapid growth appearing in 6 to 10 days. Frequent contaminations resulted from the use of 15 per cent hydrochloric acid alone, and for this reason a weak malachite-green solution was added to the Besredka bouillon. Both methods proved fairly suitable with the milk and pulmonary secretions of cattle.—*Zur Züchtung und Differenzierung der Tuberkelbacillen. I Tl., K. L. Wolters and H. Dehmel, Centralbl. f. Bakt., I, Orig., 1930, cxvii, 279.—(H. J. C.)*

Isolation of Tubercle Bacilli from Blood.—Löwenstein's method for the isolation of tubercle bacilli from the blood involves considerable technical difficulties which are usually not emphasized sufficiently. It is important to free the sediment from all traces of haemoglobin, and to wash the final sediment until it is small in amount and not heavy. The entire sediment must be seeded on culture tubes. A macroscopical control of the tubes is not sufficient. If no colonies are seen smears must be made from the surface scrapings; and it will be found that in a considerable number of macroscopically negative cases acid-fast organisms are found which on transplantation may grow to visible colonies. Certain contaminating organisms, such as sarcinae, seem to stimulate the growth of tubercle bacilli. In recent examinations a number of positive results were obtained from the postmortem blood of tuberculous patients. *In-vivo* tests yielded positive results in patients with various forms of tuberculosis and acute polyarthritis. In some of the latter patients obsolete tuberculous foci were found, and the opinion is advanced that an acute infection may mobilize tubercle bacilli from an old tuberculous lesion. It is still uncertain whether all acid-fast bacilli found on those cultures, particularly those which do not grow up to visible colonies, are true tubercle bacilli or not.—*Zur Kenntnis der Tuberkelbacillenzüchtung aus dem Blute (nach Löwenstein), H. Popper, F. Bodart and W. Schindler, Wien. klin. Wchnschr., November 27, 1931, xliv, 1494.—(M. P.)*

Virulence of Human and Animal Tubercle Bacilli.—The author uses his previously described intracutaneous injections of small amounts of cultures to determine the virulence of tubercle bacilli. Variations in the incubation period, the time of development of the primary affect and the grade of generalized tuberculosis are significant. The number of low-virulent strains of bovine source were greater than those from human sources, although low-virulent human strains were studied. Tests were performed on mice and rabbits as well as on guinea pigs. Intravenous tests with bovine strains proved these to be more virulent for mice than were human strains. For type-differentiation the mouse test was not satisfactory, but the rabbit proved very valuable. Three times, in examining material from cervical lymph nodes and lumbar punctures, as well as from sputum, two types of tubercle bacilli were found coincidently, indicating an infection with two or more strains as a possibility. On account of the great susceptibility of guinea pigs, slight virulence differences did not occur regularly in these animals. In testing bovine cultures, fresh cultures are essential. Human types change in virulence only over years of culture. The source of the material, whether cultures, organs or animal passage, is significant for the outcome of the test. As a rule, less virulent strains were found in the milder types of tuberculosis, although the resistance of the individual must not be lost sight of as a determining factor. The author recommends that his method be utilized only by experienced workers.—*Zur Frage der Virulenz der bei menschlicher und tierischer Tuberkulose vorkommenden Tuberkelbacillen. Versuche an Meerschweinchen, Mäusen und Kaninchen, B. Lange, Ztschr. f. Tuberk., 1930, lvii, 129.—(H. J. C.)*

Non-Acid-Fast Tubercle Bacilli.—Eleven strains of tubercle bacilli were tested on egg media to which other substances, including cardiazol or coramin, were added. Non-acid-fast forms appeared, which was believed to be due, not to a transformation of acid-fast into non-acid-fast forms, but rather to an increased multiplication of the non-acid-fast forms from the original strain. It is questionable whether it is possible to transform the tubercle bacillus from acid-fast to non-acid-fast types.—*Zur Frage der nichtsäurefesten Formen des Tuberkelbacillus, E. A. Schnieder, Ztschr. f. Tuberk., 1930, lviii, 247.—(H. J. C.)*

Filterable Phase of Tubercle Bacillus.—Thirty-seven guinea pigs were inoculated with filtrates from tuberculous material from 16 different sources. Two animals yielded definitely positive findings. Classical tuberculosis was reproduced and the typical Koch bacillus recovered in pure

culture. These positive results have come only when the original material was richly seeded with the granular form of the tubercle bacillus. From the same granular sources two other guinea pigs have also developed lesions which are possibly tuberculous, but which were not significant enough to warrant further injection or culture. Evidence for the correctness of the filtration point of view can, in the beginning at least, be based only on definitely positive results. Recent studies demonstrate that the filterable form is granular or coccoid; for it has been cultured *in vitro*, albeit in non-acid-fast form, which *in vivo* gradually returns to the normal pathogenic bacillus. In the absence of an isolatable tubercle bacillus from lesions which are histologically indistinguishable from known tuberculosis, one is not justified, with the present knowledge of the life history of the tubercle bacillus, in drawing conclusions as to filterability. On the other hand, histological evidence of tubercles in guinea pigs is not of itself sufficient proof of filterability. Such lesions have been caused by gram-negative paratyphoid-like microörganisms. This was shown, not only by the isolation and pathogenicity of the latter, but also by the failure of the histological tubercle to produce true tuberculosis when reinjected. The relation of this group of microörganisms to lesions indistinguishable from the necrobiotic type of tubercle lesions in pigs must always be borne in mind.—*Experiments on a Filtrable Phase in the Life History of the Tubercle Bacillus, R. R. Mellon, Tubercle, October, 1931, xiii, 10.*—(*M. E. P.*)

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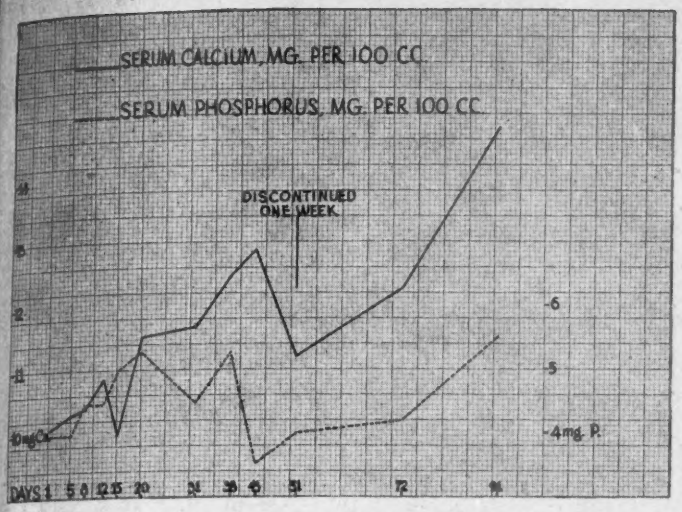

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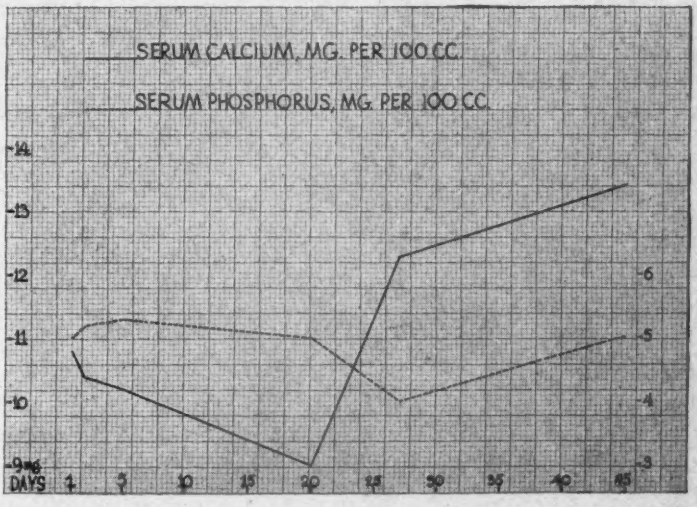

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